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General Practitioner and Tuberculosis.—It is almost always true that the family physician has the first opportunity not only to ascertain the presence of tuberculosis but to give battle for the cure of the afflicted and prevention of further contagion. The obligation is his to make such early diagnosis and take such steps as will provide proper safeguards for all, and no organized campaign against tuberculosis or any other disease can be carried to a successful conclusion without his whole-hearted support and assistance. Although in twenty years the tuberculosis mortality has been cut in half, 100,000 persons in the United States still succumb annually, about 2,000,000 have tuberculosis in some form and nearly 1,000,000 have active pulmonary tuberculosis. Even after twenty years of intensive educational publicity the diagnosis is still often delayed for six months to a year or more, entailing incalculable suffering. The only reasonable excuse for this is failure of the patient to consult a physician. Most important it is for the physician to suspect tuberculosis, particularly in chronic illnesses. Early diagnosis may be hard or easy, but a definite or probable diagnosis can generally be made if the patient is diligently and methodically studied. Many failures to make an early diagnosis are due to failure to take a careful history and make a careful examination. Especially should the examination be most careful and conscientious if the symptoms complained of are vague and indefinite, and facetiousness or frivolity are quite out of place. It is infinitely better for the physician to be surprised to find tuberculosis than to be chagrined later to find another physician has made the diagnosis. The first step is to obtain the history, past and present, and follow up all clues. In this a definite plan or scheme, not too lengthy and cumbersome, should be followed. The same is true of the examination itself. In this auscultation is perhaps most important, except in children, and it is important to listen intelligently and purposefully, both on deep inspiration and after expiratory cough. Frequent use should be made of the X-ray examination, especially in border-line cases. If in doubt, the physician should consult the chest specialist, chest clinic, or sanatorium medical superintendent, and the conscientious physician will familiarize himself with such resources available. After an early diagnosis has been made the patient should be promptly informed and the nature, curability and essentials of treatment explained. Dishonesty is tragic for both patient and family. It is mistaken kindness. Nobody will assume all the requirements of treatment unless informed or carry out the proper protective measures with respect to others in the household. "Nervousness" is no

excuse for deceit or half-truths. It is better for the physician to lose the patient than to lose his own self respect. *Treatment:* We now know that it is possible to so thoroughly heal tuberculosis that the disease process cures by absorption rather than by fibrosis, as long taught; also that it is possible for cavitation to disappear. For the great majority of patients treatment in a well-conducted sanatorium is best, at least for several months, and it is the duty of the physician to be informed as to the sanatorium treatment available, the method of procedure for admission, cost of treatment, and how to secure admission to public institutions of patients unable to assume the full expense. If the physician accepts the serious responsibility of home treatment he should be willing to give much time and thought to every detail and advice as to building sleeping porches or making other arrangements for outdoor living. The program of treatment should be outlined to both patient and family, as an uninformed family may prove a serious detriment to progress. Good judgment should be used in fresh-air dosage and exposure, especially in severe winter weather. Regarding diet, three nourishing meals with three or four glasses of milk a day are enough, and when the patient attains a safe reserve above normal weight these may be reduced. It is not advisable to make the patient get too fat. *Prophylaxis:* It is the duty of the physician to give detailed directions as to disposal of sputa or other excretions and sterilization of dishes and other articles used. The services of the public-health nurse should be used and teaching repeated as often as necessary. Contacts in the family should be examined. It is important to recognize and watch children who are infected if the real incipiency of the disease is to be attacked. These children do very well under watchful care but very badly without it. The idea is too current that a positive tuberculin skin test is of no practical significance. The latent or "pretuberculous" stage in children is highly important. If the physician is alert for early indications of tuberculous infection and disease he will prevent many adult pulmonary cases and contribute materially to continued declines in tuberculosis mortality. Children in good physical condition with a positive skin test may not need any special treatment but those who have symptoms and are below par, especially if there is X-ray evidence of tracheobronchial lymph-node involvement, do need it. In many of these, especially above 12 years of age, early pulmonary changes are detectable. However, most of these cases are easily and quickly curable. In New Hampshire about 300 such little patients made almost without exception an immediate and rapid response getting up to normal nutrition and losing symptoms, and most of them under home treatment, with regulation of the life of the child, particularly with reference to rest, sleep and diet, with the addition of codliver oil. Of 37 children with active pulmonary tuberculosis, 14 with bacilli in the sputum, 10 have died, 3 are failing, 11 improving, and 13 have reached an arrest. All these latter have required prolonged treatment and supervision. A series of tuberculin tests on 1090 children in New Hampshire showed 43 per cent positive reactors, which is comparable to the results of surveys in New York and Massachusetts. *Rehabilitation and Education:* Upon the return of the patient from the sanatorium the physician again has serious responsibilities and problems. In the hopeless progressive cases he can alleviate and ease the rigors of the long trail to the grave. He should also be a teacher of preventive medicine and active in all proper antituberculosis activities, as an influential and respected citizen.—*The Responsibility of the General Practitioner of Medicine for the Cure and Prevention of Tuberculosis, R. B. Kerr, New England J. M., June 6, 1929, cc, 1201.*—(*A. P.*)

Pre-Sanatorium Experience of Tuberculosis Patients.—Twenty-five sanatoria were asked to participate in this piece of social research, selected as representative of both public and private institutions in different sections of the United States and Canada. Eighteen of these finally cooperated. They were asked on a specific day to take a history of every patient who had entered with pulmonary tuberculosis, excepting children, the mentally subnormal, and those transferred from other institutions. The history form is given in full. The assembling of histories began in the summer of 1927 and was completed in February, 1928. The number for white persons conforming to requirements was 1499, 762 men and 737 women. Exclusive of Canada, this represents about 2 per cent of sanatorium beds in the United States. Relatively more men than women were in the far-advanced stage. The largest proportion of minimal cases was admitted in the early twenties, but even so it constituted only 16 per cent at this age, and 12 to 13 per cent for all ages. There was a decided preponderance of single men and women, higher than for corresponding age-groups at large. Doubtless the reason is that the married tuberculous individual, man or woman, is apt to feel the responsibility of the home too much to leave it. Another cause may be that

many single persons have no homes in which to be cared for. Thirty-three per cent of the patients sought medical advice within a month after the first symptom and 1 per cent before any symptoms (contacts, routine examinations, etc.). Twenty-four per cent delayed from 1 to over 20 years before consulting a physician. Forty-three per cent were diagnosed by physicians within a month of first seeking advice, and 20 per cent at the first visit. This is distinctly encouraging. Less so is the fact that 16 per cent had to wait a year or more before being advised they were tuberculous. So far as the histories show, the stage the tuberculosis had reached by the time the patient entered the sanatorium had little relation to the celerity with which the patient sought the doctor or with which the doctor made a diagnosis. The whole sanatorium group showed about 12 per cent minimal, 43 per cent moderately advanced and 45 per cent far advanced. About the same proportion of each group was diagnosed on the first visit, about 20 per cent. These figures confirm what clinicians generally believe, that there is a vast amount of concealed tuberculosis which frequently does not become evident until the lungs are considerably involved. This suggests that much more attention needs to be given to the examination of the apparently well.—*A Study of What Tuberculous Patients Experience Prior to Their Admission to a Sanatorium, L. R. Williams and A. M. Hill, New England J. M., July 11, 1929, cci, 82.*—(*A. P.*)

Tuberculosis in Old Age.—There is much more tuberculosis in the aged than has been formerly supposed. Data show that the death-rate in the seventh decade is higher than that in younger decades. In the dissection of 1800 corpses of elderly people, 117, or 9 per cent, were found to have had recent and 324 cases old, stationary or slowly progressive tuberculosis. Most of these instances of old, healed tuberculosis appeared to have recently become reactivated. This undoubtedly may be brought about clinically by diabetes, influenza (followed by rapid spread), grippe and sometimes neoplasm. Occasionally *new* tuberculosis is observed in association with starvation, sepsis, injury, etc. Such lesions are especially at the apex and not in the infraclavicular regions. Cavity is uncommon (10 per cent) in the cases described, and may exist as a solitary cavern without dissemination, although it may contain large numbers of tubercle bacilli. Seeding of one lung was observed in about 10 per cent of the cases of tuberculosis. But tuberculosis in elderly people is frequently associated with emphysema. The clinical (physical, roentgenological and laboratory) findings may resemble those in younger people. But when the cartilages are ossified, the percussion findings are slight, with little or no change in Krönig's isthmus, voice-sounds are moderately distant generally, but more intensified over infiltrated areas, there are but few râles after cough. These findings are not trifling. The X-ray usually reveals much more than one inexperienced in the examination of chests of old people would expect, and the plate is indispensable. The sputum frequently contains tubercle bacilli, despite what many authors state. This examination should be done much more often than it is in an old person with a chronic cough, even if it is but to protect those in his surroundings. It is often not done because the patient has been coughing for many years, from bronchitis. Haemoptysis is not uncommon, but slight pulmonary bleeding is exceptional. Fever is frequently absent, but the pulse tends to be rapid. Rectal temperature only is permissible in the aged. The appetite is frequently good even in the face of some emaciation, but there is some weakness, although many patients may pursue their normal occupation without undue complaint. A florid type of the disease is very unusual. A few such have been seen in diabetics. As a rule the course is very slowly progressive, with symptoms inconspicuous. Occasionally some intercurrent pulmonary disease causes a hastening of the process. When tuberculosis is associated with emphysema, signs and symptoms of the latter predominate, with the exception of clouding of the apex, a few fine râles, and bacilli in the sputum. The local and focal reactions to tuberculin are present. The prognosis depends on several factors, including the condition of the heart. Florid types may recover. Laryngeal, intestinal or serous-sac tuberculosis add to the gravity of the outlook as do the presence of diabetes and a pronounced cardiac weakness. The diagnosis may be very difficult. Weakness, debility, anorexia, subnormal temperature in the aged, especially if tuberculosis is known to have been present in the family, suggest tuberculosis even when signs in the lungs are wanting. The tuberculin reactions are of great help. Every case of chronic bronchitis should be carefully investigated in order to eliminate tuberculosis. Prophylaxis is important, especially such general measures as abundance of rest, lessening of strain and prevention of excessive use of alcohol. It is of importance to protect the surroundings of all coughing people of old age, especially since the care of children is often delegated to the older members of the

household. Old people pet and fondle children, feed them with their own eating utensils, sleep with or near them and are often very careless about their spitting, etc. In treatment tuberculin is of great importance but sometimes is contraindicated because of the presence of other diseases, and lack of coöperation. Initial dosage should be small and the increase slow. It is frequently observed that many symptoms improve greatly, but not in all cases by any means. It is palliative only. All other treatment is general and also palliative. Too much opiates are not advisable because a certain minimal amount of cough is necessary. Sanatoria in high altitudes are not favorable to old people.—*Repetitorium der Alterskrankheiten: die Lungentuberkulose in Senium, H. Schlesinger, Deutsche med. Wchnschr., January 4, 1929, lv, 18.*—(*H. S. W.*)

Tuberculosis Reporting and Mortality.—It is trite to say that early discovery of pulmonary tuberculosis is of prime importance to accomplish permanent results in treatment, yet neither patient nor physician can always be held responsible for delay in discovery since the symptoms often do not appear until the process has advanced pathologically, the keenest ear may not detect the lesion, and the help of X-ray films is not always sought; in addition, opinion is not unanimous on what constitutes an early case. However, the National Tuberculosis Association in its Spring campaign has brought forward the optimistic slogan "Early discovery—early recovery." The reporting of tuberculosis in Massachusetts began in 1907. For ten months of the year 1928 there were 2,545 deaths recorded from all forms of tuberculosis (up to November) of which slightly under 10 per cent had never been reported, 18 per cent reported after death, and 13 per cent less than a month prior to death, and, altogether 58 per cent within a year of death. The relative position of tuberculosis among the first 10 causes of death has changed from first in 1902 and 1907 to sixth in 1927. Under the age of one year it has dropped from third to eighth. From 40 to 49 it remained first through 1917 and in 1922 and 1927 has moved to third. In the age-group 15 to 40 it still remains first. The diminution in early infancy has no doubt been due to better milk-supply, since most of these cases were extrapulmonary, especially abdominal. Even for the ages 15 to 40 there has been improvement, the percentage of all deaths dropping from 37 per cent in 1902 for ages 15 to 19 to 29 per cent in 1927. For ages 20 to 29 there has been a 5 per cent decline, for 30 to 39 a 10 per cent one, and for 40 to 49 one of 2 per cent.—*Tuberculosis Reporting and Tuberculosis Mortality, D. Zacks, New England J. M., May 16, 1929, cc, 1036.*—(*A. P.*)

Pitfalls in Statistical Study of Tuberculosis.—Two problems are discussed as to sources of error in making comparisons of statistical data. The first involves investigations into the relative importance of infection by the tubercle bacillus and constitutional or acquired resistance to it. In this study serious fallacies are often introduced in the choice of control groups. An example is the use of patients attending institutions for the tuberculous who have been diagnosed as nontuberculous as a control group for contrast with the tuberculous in the study of heredity. The error lies in the fact that the former group is founded on the basis of a family history of tuberculosis. The principle to be emphasized here is that the causes which have led to the formation of the control group must be independent of the special factors which are being investigated. This is usually ensured by using as a control group the entire population, thus eliminating selection of any kind from the control group. It must not be forgotten, however, that the entire population contains within it all the subgroups which are being contrasted with it. The second problem involves investigations into the comparative value of sanatorium and domiciliary treatment as judged by the mortality or progress of groups of patients subjected to the two forms of treatment, as follows: *1:* In the differentiation of "sanatorium treated" from otherwise treated cases the fallacy lies in the fact that patients who do not survive the time from first observation through the minimum period of sanatorium residence automatically fall into the "otherwise treated" group. A like group should be excluded from both classes of cases. *2:* The effect of variations in the age constitution of the groups compared may be eliminated by using the ratios of actual deaths to deaths expected from life-table populations of the same ages. *3:* In the exclusion from consideration of cases with "diagnosis not confirmed," an error arises because of the better opportunities for diagnosis of the sanatorium treated cases. One should calculate the survival rates of the definite *plus* suspect cases in each instance as a check upon the rates for the definite cases alone. *4:* In comparisons between sputum-positive groups of cases error may arise because of more thorough examination of sputum in sanatoria, resulting in more positive cases in this group.

Another factor is the greater tendency of sputum-positive cases to go to sanatoria. The remedy is to compare *both* sputum-positive subgroups and whole groups, that is, sputum-positive and sputum-negative groups combined. It is thought that by carefully taking into account and allowing for such possible sources of error it is not impossible to reach a definite conclusion on this important question of the comparative value of sanatorium and dispensary treatment of tuberculosis.—*Some Pitfalls in the Statistical Study of Tuberculosis, P. Stocks, Brit. J. Tuberc., October, 1929, xxiii, 169.*—(*R. M. F.*)

Tuberculosis Survivals.—During the period from the commencement of notification in 1909 through 1928, 3,114 persons were notified as suffering from pulmonary tuberculosis in Ipswich (England). Of these, 1,613, or 51.8 per cent, are known to be dead; 1,145, or 36.7 per cent, are known to be alive; and 356, or 11.4 per cent, have not been traced. By far the greatest number of deaths occurs within one year of notification, and the number of deaths diminishes rapidly as the date of notification recedes. Thus it appears that more than one-half of the recorded deaths (over 27 per cent) occurred within one year of notification and 90 per cent within five years. Over 46 per cent of all the notified cases were dead within five years. For the last six years the proportion dying within the first year has been about 24.4 per cent. On the other hand, the deaths during the second year were just over 10 per cent of the notifications for the six years ending 1927 as compared with 10.5 per cent for the whole period. For the third year the average experience of to-day corresponds very closely with the average of the whole period. The tuberculosis scheme for Ipswich is singularly well equipped for securing the provision of prompt institutional treatment for all cases requiring it.—*Tuberculosis Survivals: The Mortality Experience of the Cases of Pulmonary Tuberculosis Notified in Ipswich since 1909, A. M. N. Pringle, Brit. J. Tuberc., October, 1929, xxiii, 175.*—(*R. M. F.*)

Tuberculosis in Tropics.—Tuberculosis is rare, even absent, in certain isolated spots, such as the upper Zambesi, parts of the Cameroons, and the interior of the Transvaal. Since primitive tribes are intensely susceptible to tuberculous infection this rarity is due, not to immunity, but to the nonintroduction of the tubercle bacillus. Figures are given for several British colonies, indicating the high incidence and mortality where tuberculosis has been introduced, and showing that as the morbidity rises the mortality decreases. The European in the tropics is relatively less susceptible than the native and more susceptible than the European at home, not because he bears an inherited resistance, but more probably because he possesses a higher power of acquiring resistance than the native. When comparing the white with the black races a more important factor than mere susceptibility is the mode of life. The causes of the prevalence and spread of tuberculosis among the natives are chiefly the introduction of the tubercle bacillus into "virgin soil," crowding, poor hygiene, industrialism, the universal spitting habit, and early marriages with frequent insanitary parturition. Tuberculosis without pulmonary involvement is rare. "Virgin soil" or "natural" tuberculosis is defined as the disease following infection of the nonimmunized, and advances in three not definitely separated stages. From the primary focus, usually but not necessarily always single, the lymphatic system provides the principal channel for the transference of tubercle bacilli to distant parts of the body in early cases. The second stage, then, is adenitis of the cervical, mesenteric or tracheobronchial nodes. While normal lymph nodes retain the bacilli, reacting to form tubercles, enlarged and inflamed nodes may let the microörganisms through. Under unfavorable conditions, among which must be included massive infection, dissemination occurs, resulting in a caseous pneumonia or bronchopneumonia, or a focus may open into a blood-vessel, and general distribution result. The chief negative characteristic of such "virgin soil" tuberculosis is the absence of any attempt at delimitation of lesions. A "larval" type of disease is described, in which presumably there has been an antecedent subinfection with a more recent slight and not too frequent reinfection. The type presents no sign of disease except a positive reaction to tuberculin. Such cases are, however, in a state of unstable equilibrium, and may remain well or become acute or chronic types of the disease, dependent upon the force of circumstances. If death occurs from disease other than tuberculosis, healed tubercles are not found at autopsy. The "larval" type is intermediate between the "virgin soil" type and the "modified" or chronic type, but verges to the former. In the native the chronic type may follow the "larval" stage after repeated autoinoculation. All who have studied tuberculosis in the tropics have been struck by the rarity of so called "surgical tuberculosis." The tropics offer many disadvantages

as a health resort, some of which are the necessity of indoor life to avoid the tropical sun, the irksomeness of travel, the general discomfort, the lowering of mental and physical energy, and the liability to parasitic diseases and to infections such as enteric fever and dysentery. The idea of the efficacy of the tropics as a health resort arose from the mistaken view that absence of the disease among primitive races was due to immunity, which was the result of climatic conditions and exposure to the sun's rays.—*Tuberculosis in the Tropics, H. H. Scott, Brit. J. Tuberc., October, 1929, xxiii, 179.—(R. M. F.)*

Tuberculosis in India.—Except only malaria tuberculosis is the greatest cause of death in India. Contributory causes of the widespread distribution of tuberculosis are the introduction of Western civilization with the consequent changes in the social, economic, and industrial environment, and the native customs, such as child marriage, confinement of women indoors, and intermarriage within the caste. The course of the disease is usually acute, with death within a few months, though there are occasional chronic types. Where the people live the more primitive outdoor life there may be found many quiescent cases able to work. Any plan of treatment should be directed at social, economic and sanitary reforms, treatment and prevention of disease in children, and early recognition and treatment in adults. The sanatorium still offers the best means of treatment for all cases. There are only about eighteen such institutions in all India with its three hundred and twenty millions of people. The best plan is for a garden colony incorporating a sanatorium. In 1928 the author established such a unit at Thambaram, with the idea that similar units should be built for each of the Presidency capitals, but there has been a lack of financial help from the Government and the Indian public.—*The Problem of Tuberculosis in India, C. Muthu, Brit. J. Tuberc., October, 1929, xxiii, 190.—(R. M. F.)*

Incidence and Types of Phthisis in Wales.—It has long been known that it is possible to classify the various racial and social groups of mankind according to the clinical type of tuberculosis which tends to prevail among them. Among the native African people, the so called "natural" form of tuberculosis, an acute type of disease with a tendency to a general infection, is most often seen, whereas in the more complex communities, such as are found in China and India, the inhabitants exhibit an intermediate type of disease between the "natural" and the "modified" forms, characteristic of Western Europe and the United States. In Wales there exists a very definite correlation between the clinical type of tuberculosis and the racial and social groups of people. Both the "natural" or acute type of disease and the "modified" forms are prevalent. In upland rural Wales, where the inhabitants are predominantly of the dark, short, Mediterranean stock, acute tuberculosis among young adults is the most prevalent form. Here too the death-rate is high. The occupation of these people is chiefly that of sheep-herders. In lower rural Wales the fair Nordic people predominate. Here agriculture and not herding is the chief occupation. In these people, in this particular locality, tuberculosis is less marked, and that which is present is of the "modified" or chronic type, with a low death-rate. The most interesting fact of the study is that the incidence and type of tuberculosis among the same two groups of people, the Mediterranean and the Nordic, in the mining regions of Wales, is just the reverse of that found in rural Wales. In the mining or industrial districts it is the Mediterranean type of people who suffer less from tuberculosis, and that present is the "modified" or chronic type with a low death-rate, whereas the disease is quite prevalent among the Nordics and is of the acute type. Hence it seems that the Nordic type is more suited for rural than for urban life and industrial conditions, and that his resistance falls when he is transported to an urban community, while, apparently, the dark Mediterranean type is better suited to urban and industrial conditions, under which his resistance to tuberculosis increases. It seems that by the advance of regional survey of the adaptation of racial and social groups to their environment—physical, human, and bacterial—in its evolutionary aspect, further progress in the study of the epidemiology of phthisis may be made.—*The Incidence of Phthisis in Relation to Racial Types and Social Environment in Wales, E. G. Bowen, Brit. J. Tuberc., July, 1929, xxiii, 132.—(H. McL. R.)*

Tuberculosis Mortality in Lithuania.—The mortality figure for tuberculosis in Lithuania for 1925 is given as 28.7 per 10,000 living individuals. While the total mortality decreased from 190 per 10,000 in 1924 to 177.2 in 1925 the tuberculosis mortality increased slightly from 25.9 to 28.7. Pulmonary tuberculosis is the most common cause of death. The mortality of children up to 5 years is almost double the highest figure for adults between the years of 25 and 30 and is 63 per 10,000. The

high childhood mortality is ascribed to the frequency of infection, which is not to be wondered at on account of the low cultural and economic standards of the inhabitants.—*Zur Tuberkulosesterblichkeit in Litauen, L. Kogan, Zeitschr. f. Tuberk., 1928, lii, 214.—(H. J. C.)*

Clinical Course of Chronic Pulmonary Tuberculosis in Russians.—This paper is the result of clinical studies collected in the Archives of the Institute I for Tuberculosis at Moscow, directed by Lapshine. Workmen and peasants were chosen as being of purer stock and more representative than the intellectuals. Most of the patients were between 20 and 40 years of age, none below 17. The material comprises only so called chronic pulmonary tuberculosis (Ranke's third stage). The antituberculosis organization in Russia is briefly detailed. For six years there has been such a body, in close contact with medical organizations and with the people, Soviet medicine having a social character. At the centre of the organization are the relief nurses, working under medical direction and in coöperation with workmen's bodies. There are dispensaries, 14 at Moscow and others in the larger towns and beginning to penetrate the rural districts. Auxiliary to the dispensaries are emergency sanatoria, of which there are 34 at Moscow. Over about five years 400,000 persons have consulted the dispensaries and 28,000 have been served by the auxiliary establishments. To direct these there are in the large cities tuberculosis institutes or special hospitals accommodating an average of 400 patients. The patients are admitted through the dispensaries. There are two such in Moscow and 10 scattered throughout other cities. Turban's classification is used for recording the extent of the disease, the letters A, B and C, proposed by an American Association, being added to designate the degree of compensation, subcompensation, or decompensation. Such a notion, however, had been proposed before the War, perhaps independently, by Sternberg. Group A is characterized by (1) normal temperature, even at work, (2) absence of signs of intoxication, (3) stable weight, and (4) functional integrity. Group B is characterized by (1) subfebrile temperature, maximum 38°C., (2) phenomena of moderate intoxication, (3) unstable weight, and (4) limited capacity for work. Group C is characterized by (1) constant elevation of temperature to 38°C. or more, (2) pronounced intoxication, (3) constantly diminishing weight, (4) impossibility of working, and (5) weakness necessitating confinement to bed. Of late years, Russia has borrowed from the Germans three clinicopathological terms,—fibrous, productive and exudative. These may be added to or supplemented by productive-fibrous and productive-exudative. In reality they all merge to some extent. The various modes of onset are described. It is remarked that in the fibrous form the temperature may remain normal after initial haemoptyses or very slowly become subfebrile. Chills and sweats are characteristic of the more severe productive and exudative forms. Along with them may go increasing dyspnoea and cardiac palpitation. Vertigo and cephalalgia may be early symptoms, also insomnia and loss of appetite. Pains of various character may be complained of. Severe coughing may induce vomiting. Nausea and abdominal pains may occur in either benign or grave forms, in the latter being usually associated with intestinal lesions. Moist râles in the chest are generally more prominent in the exudative form, changes in breath-sounds in the fibrous. In about half the fibrous cases the hilum shadow is exaggerated, with remnants of swollen and caseous lymph nodes, also in about 25 per cent of the productive, but almost never in the exudative. Cavities occur in 11 per cent of the fibrous forms, 70 per cent of the productive, and always in the exudative. Cardiac dilatation and low arterial pressure are demonstrable frequently. Tubercle bacilli in the sputum are rarely found in the fibrous forms, or occur only at intervals. The graver forms are accompanied by leucocytosis. The tuberculin cutireaction is practised in three dilutions, 25 per cent, 5 per cent, and 1 per cent. With the weakest dilution it is positive in only 18 per cent of the fibrous form, and never in fatal cases. It is very rarely negative in all three dilutions in benign forms. It is an unstable reaction, constantly changing and may become feeble during periods of acute intoxication. In fatal cases there is also accelerated red blood cell sedimentation and a positive Moritz-Weiss reaction. Fever is highest in the exudative form and may exhibit inverse phenomena, with morning elevations. The duration of disease prior to treatment is longest in the benign forms, shortest in the exudative. There is an active evolutive form without ulceration, comparable to Bertier's "diffuse discrete form" or Bard-Neumann's diffuse fibrous form. There are also localized and extensive ulcerofibrous forms. Fluoroscopy in the former cases shows fibrous arborescences, mottling of a productive character, together with, in the ulcerofibrous, cavities. A characteristic of this form clinically is rapid reëstablishment. Complications are rare, although tuberculous throat lesions

occur in 10 per cent. In Russia the term *productive-fibrous* includes many of these "ulcerofibrous" and "diffuse discrete" forms. Bacilli are often present in the sputum but the tuberculin reaction is less often positive in all three dilutions. Periods of quiescence may last several years. The productive form is apt to be progressive in its course, but certain favorable subforms develop fibrosis. This form is analogous to Bard-Neumann's "fibrocaseous" form. Unfavorable cases develop chills, sweats, wasting, and persistent evening fever. Cardiac changes appear quite early in young patients: Dilatation, muffled tones, sometimes murmurs, tachycardia or arhythmia. Arterial pressure is often low. Fatal cases become prostrated, cyanotic, with dyspnoea, weak pulse, and oedema of the feet. Laryngeal and intestinal complications occur frequently, in 75 per cent of fatal cases; less often, nephrosis, renal tuberculosis, meningitis and generalization. Amyloid liver and spleen may occur. In general, 40 per cent of patients die of the productive form. Summing up, its characteristics are multiplicity of symptoms, and activity of the lesions, with a long time necessary for amelioration. The temperature curve is characteristic. The productive-exudative form is in 12 per cent of cases preceded by pleurisy. The total duration is usually two to four years. Its most characteristic symptoms are wasting, weakness and cachexia. The cutireaction is variable. Enlargement of liver and spleen is common, due either to tubercles or amylosis. Intestinal and laryngeal complications are frequent. Patients die of asthenia, with cyanosis, dyspnoea and sometimes lethargy. The pure exudative form is rare, but some 15 patients are included. Ninety per cent die within a year and all are CIII cases. Toxaemia is profound. For instance, sweats occur in 80 per cent, and chills in 70 per cent, as compared with 28 per cent and 25 per cent for the fibrous forms. In over half the cases the cutireaction is entirely negative. The temperature curve is high and occasionally inverse. Adhesive pleurisy is always found at necropsy, corresponding with the frequent complaint of pain in the side, chest and back. Haemoptyses, temperature and immunity are discussed at length, and illustrations of transformation of type of disease given. In general, the fibrous form, with little or no temperature as a rule, is the earliest in the usual chronic case. Then, if progression occurs and the productive type ensues, we have persistent fever. The juvenile type, described by Hollo, is referred to, of which the symptoms and manifestations are multiform. Subfebrile temperature, not over 37.6°C., is the rule. Hollo affirms that he has never seen a transition into phthisis but adds that a part of senile phthisis may result from this form. Twenty years ago, however, Stürtz wrote that "juvenile tuberculosis is an immediate introduction to phthisis." The German school have objected to this on the ground that chronic apical tuberculosis, the tertiary phase, really represents an exogenous reinfection. It is quite possible that the fibrous forms represent either exogenous or endogenous reinfection, not too massive. Endogenous reinfection more often takes the form, as seen after haemoptyses, of small acinous lesions (productive) which may progress to the exudative stage. Histories are cited illustrating such transition. Westenrijk believes the capacity to form fibrous tissue fails in the later stages but is very active in the initial period and the middle period in favorable forms of chronic tuberculosis. Turban's classification should be restricted to a description of the extent of the lesions since fibrous tissue may be extensive yet compatible with a good prognosis. The course of evolution of the disease has been observed by Dumarest in sisters in one family, as follows: hilar adenopathy, → diffuse sclerosis, → fibronodular active tuberculosis, → fibrocaseous ulcerative tuberculosis.—*La symptomatologie et la cours de la tuberculose chronique. des poumons chez le peuple Russe, N. Westenrijk, Rev. d. l. Tuberc., December, 1928, ix, 843.*—(*A. P.*)

Epidemiological Viewpoints in Campaign against Tuberculosis.—In addition to the care which the individual must receive, it is necessary to institute prophylactic and therapeutic measures directed against tuberculosis as an epidemic. The social and environmental factors have been stressed so much by some authors as to obscure the rôle of the tubercle bacillus. Even most unsatisfactory living conditions do not cause an increase in the incidence of tuberculosis unless a source of bacillary infection is present. In a small German community, with miserable living conditions, only 25 per cent of the school children had a positive tuberculin test, while in a similar community 98 per cent were found to react to tuberculin; in this latter village the school teacher was found to have open pulmonary tuberculosis. The dwelling condition is an important factor, but crowding is certainly not the only cause of a high tuberculosis mortality rate. In many instances, crowding may be the result (and not the cause) of tuberculosis afflicting the supporting member of the family. But, if a case of open tuberculosis is present under crowded

conditions, the danger of effective spread is much greater than in spacious quarters. Therefore, any measures which improve housing conditions must be considered as important weapons in the fight against tuberculosis, especially since crowding does not only multiply the danger of spread, but it increases the susceptibility of the individual by lowering his general physical health. The occupation is another factor to be considered epidemiologically. The greater ravages among dusty trades is well known. The tuberculosis mortality rate is greater among unskilled laborers than among qualified workers, possibly because the former cannot, as a rule, find work properly adapted to them, after the age of 40. The lower incidence of tuberculosis among the higher social classes is probably chiefly due to better nourishment. At the time of the war, when all classes in Germany were forced to reduce their food, the increase of tuberculosis was general. The rapid decline in the tuberculosis mortality rate in England since the middle of the last century may largely be due to the institution of free trade causing a marked drop in the food prices. Gottstein has shown that starvation periods, during the last century in Finland, had marked effect twenty years later on those individuals who had been in infancy during starvation. Child-welfare measures, therefore, are most important. Another significant item is teaching of the masses. A rational application of individual care will reduce the cost of general measures. A successful fight must combine properly individual and general care.—*Massen- und Einzelfürsorge in der Tuberkulose-Bekämpfung, Ickert, Klin. Wchnschr., June 25, 1929, xii, 1226.—(M. P.)*

Tuberculosis Campaign in England.—It has been claimed that "Sanatorium Treatment" and the "Dispensary System" of dealing with tuberculosis have failed and that the campaign against this disease has broken down badly; our diagnosis is too late; our notification and thus our prevention is quite inadequate; our treatment is of small avail. We are neither preventing nor curing, yet vast sums are being spent yearly on our efforts. Admitting that these indictments may be partially true the writer offers some suggestions leading toward a practical constructive policy. The argument is based on the hypothesis that the arrested progress is largely due to our failure to avail ourselves of existing knowledge and of the methods that time has shown to be most efficacious. In the belief that tuberculosis is generally contracted in early childhood the author advocates more effective *dépistage*, that is, removal of the child from the source of infection at the earliest possible age. He also advocates the raising of the child's resistance and the diminishing and dilution of the infecting dose. Methods of *dépistage* (preventoria) are discussed, also tuberculosis village settlements, and especially the Hastings Intensive Experiment. The problem also has its economic aspect, and coöperation between and further development of the existing social agencies dealing with tuberculosis are strongly urged.—*Comments on the Slow Progress of the Tuberculosis Campaign, W. B. Tomson, Brit. J. Tuberc., April, 1929, xxiii, 5.—(J. S. W.)*

Antituberculosis Organization in Rural Districts of Great Britain.—The rural districts present particular problems. The dispensary is a unit to be established in as many locations as feasible. Its essential element is an intelligent, devoted and conscientious personnel. Also, public opinion must be prepared. In all schools pupils should be taught the fundamentals of hygiene, devoting considerable time to such diseases as tuberculosis. It is several years too late to begin teaching after a family is attacked by tuberculosis. In 1926 the National British Association against Tuberculosis appealed to the public for funds for an educational campaign. It designated four health commissioners as directors and organizers, and to-day possesses three mobile units which constantly tour England and Scotland. With each unit is a tuberculosis specialist, a cinematographic apparatus and a projection lantern. Films, slides and photographs explain the national program and many pamphlets are distributed. There is close collaboration with public health officials. The public needs to be informed about (1) the extent of tuberculosis and of invalidism due to it, (2) methods of prevention and control, (3) early treatment and premonitory symptoms, (4) plan of the national antituberculosis campaign, and institutions which exist for treatment, and (5) methods of individual prophylaxis in cases of known disease. The safeguarding of dairy products by action of the public-health authorities should be insisted on. Impure air, insufficient nutrition, unsanitary lodgings, too arduous labor, irregular habits, unhealthy recreation, and excesses of all kinds should be combated by every lawful means. *Obligatory Declaration:* This is one of the essentials in the campaign, and has been in force in Great Britain since 1912. Information must be exact and include (1) change of address, (2) weekly publication of figures, (3) deaths reported from other causes, (4) cured cases stricken from

the registry, and (5) transfers to or from other districts. The health inspector must seek for sources of infection or other cases among contacts, and in this the collaboration of private physicians is highly desirable and attempts should be made to check up the exactness of the reports. *Dispensaries:* Sir R. W. Philip, in 1887, defined the functions of an antituberculosis dispensary admirably. In each British administrative district the dispensary is part of the Public Health Service and the Health Inspector is its administrative head. The Tuberculosis Inspector is independent only from the clinical viewpoint. In certain cases there are subdispensaries. It should always be in an accessible location, with secondary posts where needed. Patients may, in certain instances, be examined at home as well as in the dispensary. Gloucestershire, which covers 785,000 acres and has a population, largely rural, of 333,700, has six dispensaries. There are at present some discrepancies in the distribution of dispensaries, which are cited. The dispensary should be, first, a diagnostic centre, and it can best be this if its personnel are on the alert to discover new cases among those in contact with already declared cases. It must have a competent medical inspector, well grounded in general medicine and really a specialist in tuberculosis. Such a qualified man should win the confidence of the profession and public. In addition, certain personal qualities are important. In certain small rural localities it is the custom to appoint a physician to several diverse posts, such as medical inspector of tuberculosis, health officer, school physician, maternity and childhood physician, etc. This multiplication of functions is not to be encouraged, and the physician who fills all these positions cannot be regarded as really a specialist. Again, numerous medical inspectors of tuberculosis consider the post merely a step on the way toward the higher rank of Health Officer. They should be offered enough to encourage them to remain in tuberculosis work. The second essential condition for coöperation is modernization of dispensary equipment. It should possess an X-ray outfit, a laboratory and several beds for patients under observation. If the tuberculosis inspector is competent and his dispensary well equipped, the physicians will come to lend him their support and the dispensary can become a model diagnostic centre. An active dispensary has a varied clientele. Some of the visitors are suspects; others present all the clinical types of the disease at different stages, and must be sorted out and distributed. Cases sent for diagnosis may be examined, either (1) in the dispensary, (2) in the referring physician's office, (3) at the patient's home, or (4) in a special hospital where they are kept under observation. Beds for observation at special hospitals are very essential (1) for doubtful cases, (2) for acute cases, (3) for those cases in which a decision must be made as to the best form of treatment. The medical inspectors may find themselves called into consultation by local physicians. Also, they must visit at least once the home of every case sent to the dispensary, in order to appreciate family and home conditions. The patients must be followed up, otherwise they become lost sight of. For this task the visiting nurses are indispensable. In Great Britain they are attached to the dispensaries and under control of the medical inspectors. They should (1) verify domiciliary and economic circumstances, (2) give verbal and written instructions regarding prophylaxis, and (3) take measures to have contacts examined. Following their visits reports are made to the medical inspector. These nurses give no actual care but this can be obtained by application to the health authorities through regional nursing associations. A competent, amiable and devoted nurse exercises an enormous influence. The dispensary also assists the family of the patient. These families are classified as (1) those who will probably not need financial assistance, (2) those who will need it sometime, and (3) those who need it at once. The question of employment of discharged sanatorium patients is also a problem in which the dispensary enters. *Family Placement and Domiciliary Treatment:* Since 1925 London has had a system in operation inspired in part by the *Oeuvre Grancher*, with a view to separating living children from gravely contaminated foci in families where there exists advanced tuberculosis. Most of these children come from poor families and are ill-clad and cared for. They are placed with their parents' consent in the country under good hygienic conditions. Great attention is paid to domiciliary treatment, not as a substitute for, but a supplement to, sanatorium treatment. It comes under the National Insurance System in Great Britain. Much attention is given to the family—their living conditions, exposure to contamination, etc. The patient should be the sole occupant of his room and bed. If indigent, food is furnished. The visiting nurse furnishes sputum containers, napkins, etc. Patients able to work report at intervals to the dispensary; otherwise they are visited by a practising physician in their homes. The physician who undertakes to treat the tuberculous at home ought to devote a sufficient amount of time to the disease, the patient,

his treatment and supervision. The patient's psychology must be explored and studied in a personal sense, in order to appreciate his doubts, fears, hopes, morale, courage, or caprices. Intense sympathy and interest do not preclude firmness. The more interest the physician takes in the patient, the more the latter takes in his treatment. On the personnel taking part in the struggle depends its success or failure. Everywhere one encounters patients who adopt a passive attitude on leaving the sanatorium because their physicians at home lack interest. Naturally their first thoughts would be how to modify the circumstances of home life in order to put into practice advice received at the sanatorium. Sometimes the habits of a whole family must be overturned. These things ought to be discussed with them before the date of the patient's discharge. A house hygienically managed in the country offers advantages over a city dwelling which compensate for the inconvenient distances. *Open Air Schools, Preventoria, etc.:* Active cases are unsuitable for admission to these institutions. The children are kept under careful surveillance, weighed regularly, temperature taken twice daily, and regular rest and nourishment prescribed. It is attempted to teach the children the sort of work for which they are adapted. Fresh-air schools are largely in the hands of the local educational authorities, both urban and rural. *Recent Tuberculosis Legislation:* The Health Laws of 1923 give either the local authorities or the County Council the right to summarily transfer to a hospital anyone afflicted with contagious tuberculosis. Such an order need not be used for three months and is renewable. Persons suffering from tuberculosis of the respiratory system may not handle milk. The rights of appeal and of indemnity are reserved.—*Organisation de la prophylaxie antituberculeuse dans les districts ruraux, W. Brand* (*London*), *Rev. Belge d. l. Tuberc., September–October, 1928, xix, 205.* —(*A. P.*)

1927 Report of Belgian Antituberculosis League.—The League submitted painfully to forced economies ordered by the authorities. Official subsidies to the dispensaries and the *Oeuvres de Prèservation de l'Enfance* fell so low that the League Bureau asked the Provincial sections to maintain their several dispensaries. The Department of Health made certain criticisms of the organization and its methods. This resulted in an exchange of views with the Directors of the League. Especially was it alleged that the dispensaries spent too much on alimentary relief, playing the part of a charity. However, in April, 1927, the Secretariat of the League was able to announce: *1:* The League was authorized to install roentgenographic and bacteriological equipment in one important dispensary. *2:* The Directing Committee would take over the responsibility for distributing subsidies, the Department of Health reserving the right of control and veto. *3:* That subsidies would be continued for the sanatoria of Borgoumont, Magnée, Alsemberg, and Mont-sur-Meuse, to the extent of 2 fr. 50 per patient per day. *4:* That the Government approved of reasonable relief for the needy and deserving tuberculous and in such instances would contribute more than the usual prophylactic and sanitary necessities. *5:* That regarding the latter the Government would defray 70 per cent of the expense, the rest being charged to the dispensaries. *6:* That all dispensaries would regularly be visited by State Medical Inspectors. To remedy the lack of cohesion in antituberculosis efforts the League decided to create a special committee to coördinate various existing organizations. J. Bordet was prevailed on to accept the Presidency of this new *Comité National Belge de Défense contre la Tuberculose.* The League also became affiliated in a practical way with the Army Health Service. The Director intervened with the Department of National Defense to obtain the maintenance of the military sanatorium of Marchin and aided in reorganizing rural dispensary service. It has distributed special pocket containers for sputum specimens and acquired a film for educational purposes. It regrets the closing of the dispensaries of Moll, Maeseyck, Tongres and Saint Troud, due to lack of money and local difficulties, but notes with satisfaction the reorganization and modernization of those of Hasselt, Malines and Turnhout. The burning of the Palais d'Egmont destroyed many valuable books and documents, many of which will be replaced by the kindness of foreign leagues. Guinard, André, DeWinter and Dascotte have made valuable scientific contributions. The total number of clinical examinations made by physicians under the auspices of the League was 132,641; they examined 94,546 persons, of whom 17,094 were new; among these were 8,733 tuberculous. The number of tuberculous persons under dispensary observation was 38,749, of whom 13,006 had open contagious pulmonary tuberculosis. There were 10,538 consultations, 10,420 roentgenographic examinations and 12,303 sputum examinations for tubercle bacilli. The *Oeuvres de l'Enfance* benefited 4,473 children. Nurses and investigators made 76,137 visits, keeping under observation 14,169 tuberculous, of

whom 2,277 refused hospitalization. The League distributed 3,750 sputum cups and disinfected the premises in 1,862 cases. The affiliated sanatoria, representing 872 beds, have cared for 2,647 patients with 43 per cent cured or improved.—*Ligue Nationale Belge contre la Tuberculose, Comité Directeur.—Rapport général 1927, H. Renauld-Capart, Rev. Belge d. l. Tuberc., November–December, 1928, xix, 245.*—(*A. P.*)

General Hospitals in Antituberculosis Campaign.—The general hospital has a definite place in the campaign against tuberculosis. At present those which have a tuberculosis division maintain it cursorily: nurses avoid service in it when possible and almost invariably the responsibility of diagnostic and therapeutic management is placed upon young inexperienced physicians. To be successful, the tuberculosis division should be maintained as a separate unit. The phthisical should be kept away from the family indefinitely (which is usually impossible) or for a sufficient time to educate them in protecting the family from their excreta. There is much more tuberculosis in old people than is generally believed, and these should receive more attention in hospitals. The far-advanced, hopeless cases should be kept in a division apart from others. This division should also receive cases of acute tuberculosis,—miliary and meningitic types. Patients requiring surgical attention need special rooms and equipment as do those to be placed under active medicinal or tuberculin treatment. Those who will probably improve in sanatoria should be sent to such institutions, most of which do not care for patients with a definitely unfavorable prognosis. In one such hospital with 100 beds, there have lately been 120 cases of pneumothorax, phrenicotomy or thoracoplasty sent away either cured or immeasurably improved. Many of these patients were "sifted out" from the cases at the local or district tuberculosis station. Such a division can also do much in the way of diagnosis and treatment of cases of early pulmonary tuberculosis, can observe those in whom there is probably an early tuberculosis, and can study or clear up the diagnosis of the relatively large number of people with "catarrh," etc., who are dependent upon charity. It can take care of exposed children, test out new cases, apply new diagnostic, therapeutic and social measures, and educate the patient and the people in personal hygiene and the nature and modes of spread of pulmonary tuberculosis.—*Der Aufgabenkreis der Krankenhäuser bei der Bekämpfung der Lungentuberkulose, A. Sonnenfeld, Deutsche med. Wchnschr., December 21, 1928, liv, 2155.*—(*H. S. W.*)

Industrial Tuberculosis.—In general, tuberculosis or its activation should be regarded as the result of an industrial accident when: *1:* Pulmonary tuberculosis develops within a reasonable length of time in a previously healthy individual, following trauma to the chest, sufficient to cause functional impairment. In cases of this type tuberculosis should develop in the side injured, unless the factors operative are those given under *3* or *4*. Fractured ribs or clavicle or severe contusions should be considered *prima facie* evidence of such an injury. *2:* As a result of trauma to the chest tuberculosis is reactivated. In this case the liability of the carrier should cease with the arrest of the process. *3:* As result of trauma, impairment of the general health occurs, as manifested chiefly by loss in weight; tuberculosis develops or is reactivated before such impairment has ceased. *4:* As a result of industrial disease, or diseases related to injuries (pneumonia, pneumonokoniosis and the like), tuberculosis develops or is reactivated preceding recovery from such a disease or its effects. *5:* In a previously healthy bone or joint or other organ, tuberculosis develops at the site of the injury before functional and anatomical restoration of the site has taken place, or within a reasonable time after the maximum recovery from such an injury. *6:* Haemoptysis occurs from a lesion which has the appearance of an old lesion and when the history and other evidence indicate that no functional impairment existed previous to the haemoptysis, provided it follows trauma. Haemoptysis occurring during the usual occupational routine should not be considered industrial. *7:* Spontaneous pneumothorax, presumed to be of tuberculous origin, follows directly on unusual exertion or injury.—*Industrial Tuberculosis, S. J. Shipman, J. Am. M Ass., July 27, 1929, xciii, 257.*—(*G. L. L.*)

Cost of Medical Advice on Tuberculosis in Industrial Groups.—A study has been made of a group of tuberculous patients who were well paid employees of a railroad company, who could have medical attention for the asking and hospitalization at almost negligible cost, and in whom diagnosis and treatment need never be delayed because of cost. In face of this, 38 of the 44 patients of this group received into sanatoria in four years had far-advanced tuberculosis. They remained in the institution an average of 10.3 months. Of 33 of these far-advanced cases,

9 died in sanatorium, 10 were discharged as unimproved, 12 as improved and 8 as apparently arrested. Three years later, of 30 far-advanced cases, 11 were able to work (7 for the company formerly employing them) and 6 were alive but unable to work; 40 per cent were dead and 33 per cent were able to work. It cost $32,300 to treat them or $4,644 for each trained employee who returned to his work. Care of the moderately advanced cases cost $1,050 each, 66 per cent of whom have returned to employment, and $450 each for two early cases. Search for the reasons for the late (and costly) diagnosis revealed the fact that a few employees had concealed their tuberculosis and had come southwest for climatic cure, others had been slow to recognize symptoms, and a few had had no symptoms prior to a sudden onset, and some had been ex-sanatorium patients and should have had periodic examinations. The human tendency to overlook the obvious and to search for something new has appeared to delay diagnosis considerably. An advertising campaign among employees, especially foremen, superintendents, etc., which should emphasize the early symptoms of the disease is advocated. The company surgeons should have much more frequent recourse to such accessory aids as sputum examination, X-ray, etc. Routine examination of workers at the beginning of employment is important and should be carried out. "Free medical service, without special attention to the prevention and detection of tuberculosis did not control consumption in this industrial group."—*The Cost of Free Advice. Tuberculosis in an Industrial Group, E. W. Phillips, J. Industr. Hyg., April, 1929, xi, 107.—(H. S. W.)*

Antituberculosis Propaganda in Industry.—We have been slow in recognizing the significance of tuberculosis as it relates to industry and the industrial worker. There are 40,000,000 industrial employees in this country who might be reached by proper educational and propaganda methods, such as noonday talks, distribution of leaflets, etc. These should also be periodically examined. The Hudson County (N. Y.) Tuberculosis League with its well-organized follow-up system coöperates with the county tuberculosis clinics. It is encouraging the adoption of uniform methods of propaganda and examination in industry. It assists in seeking out tuberculosis, diagnosing it, sending the patient away for treatment and following him when he returns; it sees to his post-sanatorium employment. It ties in closely with sanatoria and their work. Such means, and only such, can keep the incidence of tuberculosis low in industry.—*The Tuberculosis League, the Sanatorium and Industry, B. S. Coleman, J. Indust. Hyg., September, 1929, xi, 217.—(H. S. W.)*

Portals of Entry of Tubercle Bacilli.—At present, as much as in 1890, the question as to where the tubercle bacillus enters the system continues paramount. Are tubercle bacilli ingested, or are they inhaled with dry dust or from droplets resulting from coughing? It is believed that the aerogenic path of transmission of tuberculosis is the most common. Lange was seldom successful in producing tuberculosis by feeding animals bacilli, but when only a few bacilli reached the lungs the disease tuberculosis invariably resulted. It is held that tubercle bacilli inhaled with dry dust naturally come in contact with the mucous membrane, particularly in the region of the retropharynx. They penetrate the intact membrane, usually without producing disease of the mucosa, and from there it is thought they make their way to other parts of the body, particularly to the lungs and larynx, through the lymphatic and blood-streams. The activity or non-activity of the epithelium determines whether or not bacteria penetrate the mucous membrane. The prevalence of postnasal catarrh resulting largely from our present heating system is also emphasized, since such a condition of the membrane affords a more ready entrance for the bacilli. Examination of a considerable number of patients at Bedford Hills Sanatorium showed either a dry condition of the membranes of the nose and pharynx or an actual atrophic state. It is stated that tubercle bacilli probably gain entrance to the system through the tonsils much less frequently than through the retropharyngeal membrane. Other points on tuberculosis in general are discussed. Reference is made to the use of mountain and ocean climates for different types of pulmonary and laryngeal tuberculosis. Air-baths are thought particularly beneficial, perhaps more so than sun-baths. The latter are often detrimental, whereas it is not believed that air-baths ever do harm. Mention is also made of farm colonies and occupational therapy in certain stages of the rest treatment of the tuberculous.—*Mucous Membranes as Portals of Entrance of the Tuberculous Virus, with Special Reference to the Retropharynx; also Points on Tuberculosis in General, W. Freudenthal, Med. J. & Rec., June 5 and 19, 1929, cxxix, 601 and 679.—(H. Mc. L. R.)*

Constitution and Tuberculosis.—Constitutional and hereditary factors as causes of tuberculosis were commonly believed in

before the time of Koch, but now few hold such belief. We do know, however, that there are differences in the death-rate from people of differing bodily types. The prevailing bodily types which exist are as follows: (1) Muscular,—large with broad shoulders, muscular hands, high diaphragm,—physically strong people; (2) fat, thick people—short, with short neck, wide girth, round back, small hands; and (3) frail type—narrow, often long chest, small shoulders and head, often long fingers and legs, and bad carriage,—these are often asthenic. Not all people fall into clear types and there are numerous mixed types. The population of one region of Germany has been studied carefully from this standpoint. Two large groups of people were studied as follows: 2,229, of whom 237 had tuberculosis, active or inactive; and another group of 2,624 with 265 cases of tuberculosis. With respect to tuberculosis, no bodily type is exempt, but definite differences can be shown between different types. For instance, the muscular type gets sick less than the general population. The fat type in childhood has more exposure to tuberculosis than the average but seldom to serious cases. In adults this type has a low mortality. The frail type has much more tuberculosis in childhood and adult life. These people make up 15 per cent of the general population but among tuberculous people they are present in from 48 to 64 per cent. The frail type mixed with the muscular has four-fifths of the total of tuberculosis. The muscular-fat and the fat-muscular have decidedly the least tuberculosis. Has the weak type grown so as the result of long illness? Many say so, but this is not the whole truth. It is granted that tuberculosis may influence the development of bodily form, but in adult age when type of body is established, no such influence is possible, for bones are developed. For instance, broad shoulders remain broad even in great emaciation. Frail types have a certain resistance, are strong and tough in general, and resist many diseases well, but are weak as respects tuberculosis. (It has been contended that weakness of scar-tissue and lack of complement are responsible.) It is likely that interrelation between the vegetative nervous system and internal secretions have something to do with determining the issue.—*Tuberkulose und Konstitution, F. Ickert, November 8, 1929, Deutsche med. Wchnschr., lv, 1874.*—(*H. S. W.*)

Heterologous Tuberculous Infection.—In the matter of the transmissibility of tuberculosis among animals, the human type plays a very minor rôle since most types of animal and fowl resist the strain. The bovine type is an important factor in the tuberculosis (especially extrapulmonary) of children but it is negligible in adults. It is difficult to determine the damage done to human beings by the bovine tubercle bacillus. It causes a certain number of deaths and a very much larger number of cripples and nonfatal cases. It is negligible in tuberculosis of fowl. The avian type affects swine and cattle with disease of comparatively nonprogressive character. Some of the reports of avian infection in man are open to criticism. Whether this germ really is concerned in Hodgkin's disease is an open question. Heterologous sensitization occurs but reactions are less constant and uniform than where homologous tuberculin is used.—*On Heterologous Tuberculous Infection, L. Van Es, J. Am. Vet. Med. Assn., March, 1929, lxxiv (n. s. xxvii), 505.*—(*H. S. W.*)

Trauma of Chest and Tuberculosis.—Gassing bears a relatively unimportant relation to the after incidence of phthisis. The development of pulmonary tuberculosis from all types of gunshot injuries of the chest is 0.5 per cent. Surface injuries not involving the thoracic cage and contents appear to be of relatively small importance in connection with the after occurrence of pulmonary tuberculosis. When the pulmonary tissue has been definitely injured, and especially when a foreign body is retained in or near the damaged area, reactivation of tubercle may occur in the organ affected, even after an indefinite period. This possible development, therefore, requires consideration when prognosis is under review.—*After Results of Gassing and Gunshot Wounds of the Chest in Relation to Tuberculosis, G. B. Price, Tubercle, December, 1929, xi, 97.*—(*W. I. W.*)

Transmission of Tuberculosis by Dust.—The air of the sick room of people with tuberculosis was washed through water and the latter injected into guinea pigs, each animal receiving the bacteria present in 3.38 cubic feet of air. Of fifty guinea pigs so injected, one animal developed tuberculosis, with recovery of the tubercle bacillus in pure culture. Six died of pyogenic infection. Air from an animal room containing many tuberculous guinea pigs yielded entirely negative results. Fifty-four normal guinea pigs were placed in different cages (none carrying tuberculous animals, however) scattered about over the room and six of these developed tuberculosis. This indicates that spontaneous tuberculosis in guinea pigs is a more delicate test than examining the air for bacilli. Dust from wall, floor, rugs, furniture of the sick room in twenty-

four instances was injected into guinea pigs, 25 per cent of which developed tuberculosis. Dust removed by careful and meticulous suction from clothing of people with open tuberculosis in twenty-six instances produced tuberculosis six times. Washings from the hands of children one to fourteen years old in whose family there was a case of open tuberculosis failed in twenty-six children from fifteen families to produce tuberculosis when injected into guinea pigs. The cleanliness of person and surroundings has a great deal to do with the incidence of positive results. This factor is difficult to separate from that of race, for negroes had a much higher incidence of "positives" than whites. In 26 families in which the ill member had a small number of bacilli in the sputum (Gaffky I to IV) there were 19.2 per cent positive results from all methods employed, while in 22 families in which the ill member had large numbers of bacilli in the sputum (Gaffky V to IX) there were 31.8 per cent positive results—a ratio of 1 to 1.7. Whether there is a relationship between clinical tuberculosis in the family and infected dust has not been revealed as yet.—*The Transfer of Tuberculosis by Dust and other Agents, A. E. Augustine, J. Prev. Med., March, 1929, iii, 121.*—(*H. S. W.*)

Infection of Milk Supplies.—A survey was made of the raw milk supply of three Scottish cities. There is a marked difference between the percentage of infected samples in each of the three cities. This difference is caused by the various tests, and the technique used at each centre.—*The Incidence of Tuberculous Infection in the Milk Supplies of Scottish Cities, N. C. Wright, Brit. M. J., September 7, 1929, no. 3583, 452.*—(*W. I. W.*)

Tuberculous Households.—The histories of 1,486 children under five years of age living in 1,063 homes, in each of which there were one or more adults suffering from tuberculosis, were analyzed. Of the children dealt with in this research, the majority remained, throughout their period of observation, in constant contact with an adult tuberculosis patient in their homes. The death-rate from nonpulmonary tuberculosis of children exposed to risk of infection from an adult with positive sputum was greatly in excess of the rate from the same cause in the county of Lancashire, which served as the control. This great excess of nonpulmonary tuberculosis is mainly due to deaths from tuberculous meningitis, which accounted for two-thirds of the mortality in the nonpulmonary group. The deaths from pulmonary tuberculosis of children exposed to risk in tuberculous households were too small to allow any conclusion. The calculation made by Calmette, that in France 24 per cent of the children of tuberculous mothers die from tuberculosis in the first year of life if left with the mother, is many times higher than this Lancashire experience. This research shows that the death-rate from tuberculosis for corresponding Lancashire children was 3.2 per cent; and further, from all causes, the rate was only 11.5 per cent.—*The Fate of Young Children in Tuberculous Households, G. L. Cox, Tubercle, August, 1929, x, 497.*—(*W. I. W.*)

Wet-Nurses and Tuberculous Infection.—The authors injected the milk of tuberculosis-suspect wet-nurses into guinea pigs intraperitoneally and obtained entirely negative results. Of those tested 18 were Pirquet positive, 6 indefinite and 9 negative. It is possible that the conditions are different in the presence of open tuberculosis.—*Enthält die Milch tuberkulös oder verdächtiger Wöchnerinnen Tuberkelbacillen? Hackenthal and Meyer, Zeitschr. f. Hyg., 1928, cviii, 806.*—(*H. J. C.*)

Probable Antenatal Tuberculous Infection.—The possibility of antenatal infection from the placenta is now regarded as established, though of rare occurrence, and in the case here reported seems the most reasonable explanation of very advanced lesions in so young a subject. The baby weighed 7 pounds at birth, delivery was normal, and the placenta grossly normal. The child was wholly breast-fed, began to nurse badly, to have diarrhoea, and to lose weight at the age of four weeks. It died at the age of six weeks. In addition to the usual findings in general miliary tuberculosis, the coeliac lymph nodes lying between the head of the pancreas and the portal fissure showed an advanced caseating tuberculous lesion with central cavitation. To explain antenatal infection, it seems necessary to assume a general blood infection of the mother, a genital tract infection of the mother, or genital tract infection of the father (the last being of course most rare). Inasmuch as examination of both parents was strikingly negative, and both have continued to be perfectly well, the only remaining possibility is that the mother suffers from some latent tuberculosis of the genital tract.—*A Case of Probable Antenatal Tuberculous Infection, R. H. Morley, Arch. Dis. Childhood, August, 1929, iv, 227.*—(*P. J. W.*)

Diagnosis of Infantile Tuberculosis.—Behring's theory that adult pulmonary phthisis is only the last stage of a tuberculous process beginning in early childhood

was expressed over twenty-five years ago. It has since been a fundamental notion that infection occurs more or less early in childhood, the number of contaminated persons increasing with age, and reaching 100 per cent in adults. It is, however, rare for first infection to occur at adult age. The childhood forms differ from the adult in that they are closely related to the initial character of the lesions. They are seen at all ages up to puberty, and are a reaction to first infection. In an already infected organism allergy is a factor of prime importance; the child free from infection is anergic and nonspecific forces combat the invasion and multiplication of germs in his tissues. Tuberculosis immunity is determined and increases progressively from infancy to childhood under the influence of small repeated infections. It is certain that the diagnosis of infantile tuberculosis is of supreme importance practically. If the diagnosis of tuberculous disease in the adult is not always easy, in the child it is doubly hard and sometimes extremely difficult. *Points in Diagnosis:* (1) Exact analysis of antecedents, with evaluation of the occasions for family or extrafamily contagion; (2) examination of the constitutional characteristics of the child and modifications due to feeding, living conditions, and diseases; (3) evaluation of so called "tuberculotoxic" syndromes and their differentiation from other toxic conditions; (4) biological tests; and (5) roentgenological tests. *1: Analysis of Antecedents:* The criterion of contamination is often of great help, when the clinical signs are indecisive and the cutireaction difficult to interpret. Family contagion is most important. Persons with catarrhal manifestations, chronic coughs, but of normal appearance, are most dangerous. Likewise nocturnal contact is more important than diurnal. The following points must be investigated: (1) whether the child is really among tuberculous surroundings, (2) the source of contamination and its relation to the child, (3) circumstances favoring contagion, and (4) possible causes of extrafamily contamination. *2: Analysis of Constitution and Modifying Factors:* Among these are the capacity and mode of reaction, as individual resistance or vulnerability vary. At an early age there is a tendency to diffuse generalized lesions. The question of specific hereditary predisposition arises. It cannot be clinically proved. Children of tuberculous mothers are often feeble or dystrophic, and according to recent discoveries with "filterable virus" certain of these are truly tuberculous. A tuberculotoxaemia of the foetus may also be responsible. The so called "habitus phthisicus" has been a cause of much discussion, being summarized in an individual whose total mass is reduced, skeleton thin and fragile, musculature atrophied, thoracic cage elongated, heart reduced, and lungs long and narrow. These factors occur in DiGiovanni's first combination, Viola's long-lined type, Stiller's asthenic constitution, and Sigaud's respiratory type. Preconceived opinions have, however, been refuted by recent morphological studies. The beginnings of constitutional types have been observed at a very early age, although they do not fully develop until later. The first symptoms to become manifest are, perhaps, certain "lymphatic states" related to Bartel's "hypoplastic constitution" and Paltauf and Escherich's "lymphothymic state." In childhood one must consider as of possible aetiological relation all causes acting mechanically on the respiratory organs. Among modifying constitutional factors Kleinschmidt has observed that a diet low in protein and with excess of carbohydrate favors exudative vagotonic manifestations. Improper education may injure the child's health and lower its resistance, and even give rise to symptoms simulating tuberculous intoxication: lack of appetite, fatigue, nervousness, general weakness, even elevation of temperature. Among the diseases which exert a baneful influence measles predominates, and next to this, whooping cough and grippe. Whooping cough may cause atelectasis and bronchiectasis. Congenital syphilis may cause tracheobronchial adenopathy. *Latent Tuberculosis: Occult Foci: Tuberculous Toxaemias:* The conception of latency is still rather obscure. In the child, the term is applicable to only a few cases and is highly exceptional prior to six months. There are, however, a few children of a year or less who are in apparent health but react positively to tuberculin. After the first year, it is increasingly frequent and not always appreciated. Tuberculotoxic symptoms (nutritional and functional disorders, especially) are its commonest clinical expression. As these symptoms may be due to other causes, a positive cutireaction is of great value. Even then, the relation of cause and effect may be in doubt and a further study of the individual and his antecedents is necessary. In some cases the toxins may even stimulate growth and development, especially psychic. In certain cases nervous symptoms predominate (excitement, depression, moodiness, broken or agitated sleep). Phenomena of cardiovascular erethism may predominate (arhythmias, vasomotor disturbances, tachycardias); in other cases periodic febrile disturbances. Nutritional disturbances are among the most important, varying from failure to gain weight to ex-

treme athrepsia. Their cause may be difficult to determine, as the cutireaction may be negative, due to anergy, and the roentgenographic examination rarely yields definite evidence. A very suggestive combination of symptoms is that of marked irregularity of pulse and temperature, combined with pallor and loss of weight. Most important of confirmatory biological tests is the tuberculin reaction. *Primary Tuberculous Focus and Tracheobronchial Adenopathy:* We cannot pretend to have achieved the earliest possible diagnosis of primary foci, despite the newest roentgenographic and clinical studies. Usually one finds the first signs of tuberculous lymph-node lesions coincidently with the evolution of pulmonary foci, and usually surpassing the latter in importance, but the physical signs are too slight to make a positive diagnosis. Among the functional symptoms, of most importance are cough, sometimes dry, sometimes moist, very often paroxysmal. Marfan has described a cough of double tonality, the one sound produced in the glottis, the other in an obstructed large bronchus. Raucous expiration and cyanosis and swelling of the face are also important; the latter signs are due to jugular compression. Interscapular dulness, or other areas of dulness, may be noted, due to atelectasis, compression of bronchi by enlarged lymph nodes, or foci of pulmonary congestion. Auscultation is more important. D'Espine's sign of vertebral bronchophony is of value. When the bronchi are compressed an amphoric whistle may be heard over the hilum or the vesicular murmur may be diminished over a more or less extensive pulmonary area. Dufourt has described a submammary pleurisy due to propagation of inflammation from the hilum lymph nodes to the interlobar pleural layers. Roentgenographic examination is useful to control the clinical examination and often permits in itself a diagnosis of tracheobronchial adenopathy. However, it is necessary to know exactly the situation of the normal shadows, especially about the hilum. Clearly positive are shadows occupying the normally clear spaces of the pulmonary field and outside the hilum. These are not always due to lymph nodes; they may be due to infiltrations, inflammations or other tissue reactions. Repetition of the roentgenographs at suitable intervals greatly increases their value. *Topography and Character of Lesions:* There may exist (1) periglandular hilum foci, (2) parenchymal foci, single or multiple, and (3) diffuse foci. With these processes there often alternate more or less extensive lesions of "epituberculosis" or simple perifocal inflammation. One must distinguish the lymphatic forms with pulmonary reaction and definite pulmonary foci with concomitant tracheobronchial adenopathy. The differential diagnosis between Grancher's "splenopneumonia" or "epituberculosis" and ordinary pneumonia is based on the disproportion between objective symptoms and general reaction, together with the positive tuberculin reaction. Tuberculosis of the hilum may retrogress, or spread by continuity by way of the bronchi, lymph or blood passages, and set up other pulmonary localizations. Frequently seen after middle childhood, these are not rare in infancy, as Armand-Delille and Lestocquoy have shown. The lesions may resorb or undergo grave evolution, with caseation and cavitation, particularly difficult to determine in young children by physical examination. Sometimes an eruption of tuberculides or exudative erythema will clinch the diagnosis; again recourse must be had to the X-ray and biological tests. Caseous pneumonia may remain latent for some time, with slight cough, subfebrile temperature, and then malnutrition, when the X-ray may reveal numerous small cavities or zones of hepatization. Again it may simulate pleurisy. In the last period of childhood appear forms of the disease like chronic adult phthisis. *Biological Diagnosis of Infantile Tuberculosis:* Direct search for the tubercle bacillus is more difficult than with adults, especially in the absence of sputum. Most important is the tuberculin reaction; but one must bear in mind certain conditions under which it may be negative in the presence of tuberculosis. In cases in which the skin is unsuited for performing it the subcutaneous test may be used. Individuals vary in tuberculin sensitiveness; nevertheless the cutireaction is the method of choice in diagnosing infantile tuberculosis, and pediatricians are coming more and more to favor its use. Other biological reactions referred to are urine, serum, used in cutaneous tests, complement deviation, agglutination, precipitation, serum flocculation and erythrocyte sedimentation. The importance of treating the child with latent or tracheobronchial forms is emphasized.—*Le diagnostic de la tuberculose infantile, R. Jemma, Rev. Belge d. l. Tuberc., September-October, 1928, xix, 191.*—(*A. P.*)

Respiratory Disorders in Infants.—There is urgent need for a careful analysis and proper evaluation of the various factors which induce acute pulmonary infections in infancy and childhood. The death-rate from these infections has remained stationary in recent years, whereas that from enteric infections has steadily decreased. Previous studies of ultraviolet radiation of children during the winter and early spring months,

and of the relation of nutrition to pneumonia, gave unsatisfactory results as a means of decreasing the incidence of these infections in infant-hospital wards. The present study was to determine whether the spread of infection could be prevented by purely mechanical measures, using the principles of "aseptic nursing." During the course of a winter all persons coming in contact with the infants in one ward were required to wear surgical masks and to scrub their hands thoroughly before the examination or handling of children. A comparison made with infants in a control ward showed that a decrease in respiratory diseases of only 10 per cent was accomplished by this means. Infants kept in cribs showed almost a 50 per cent higher incidence of infections than those cared for in bassinets. The frequency of infection per child was less in the protected than in the control ward. Aseptic nursing was of no value in preventing the spread of an outbreak of varicella.—*Respiratory Disorders in Infants; Attempted Prevention by Control of Contact Infection, H. Abramson and L. H. Barenberg, J. Am. M. Ass., June 29, 1929, xcii, 2156.*—(*G. L. L.*)

Tuberculosis in Young Infants.—This is a study of both postmortem and clinical findings in a series of 75 infants with tuberculous lesions at the Harriet Lane Home in Baltimore, during a period of thirteen years. Of the 73 cases of which dependable histories were obtainable, 33 per cent were positive for exposure to tuberculosis, 12 per cent were suggestive, and 52 per cent negative. In considering the 33 infants giving a negative history, the possibility of placenta transmission would have to be taken into account. From the literature the author concludes that congenital tuberculosis occurs, but is rare. Her conclusions from the autopsy findings were as follows: The tracheal or bronchial lymph nodes were involved in 83 per cent of the cases. The lungs were involved in every patient except two. One of these two infants had no lesion outside the meninges, except an involvement of the lymph nodes near the bifurcation of the trachea. The other had an involvement of only the bronchial lymph nodes and those near the aorta. Miliary tubercles were present in every case in which the lungs were involved, except three. Two-thirds of the patients had tuberculous bronchopneumonia or lobular pneumonia, nearly always caseous. This was found more often on the right side, and most frequently in the lower lobes. This corresponds with the most frequent site of cavities. Cavities occurred in nearly 50 per cent of the cases. They varied in size from those which were just visible to one which occupied nearly an entire lung. Pleural adhesions were present in nearly 50 per cent of the cases, most frequently on the right side. A pleural effusion was present once, in which case it was bilateral. The spleen was involved in nearly all cases, as was also the liver. The kidneys contained tubercles in more than half of the total number of cases. One-third showed definite ulceration of the intestines. In all cases with intestinal ulceration, the mesenteric nodes were also caseous. There were, however, nearly as many cases in which the mesenteric nodes were caseous *without* intestinal involvement. In 45 per cent of the infants in this series, tuberculous meningitis was found at autopsy. Miliary tuberculosis was present in every case of tuberculous meningitis. Solitary tubercles were seldom found in the central nervous system, possibly because serial sections of the brain were not made. Peritonitis occurred in 5 infants (6.6 per cent). In 3 cases tuberculous lesions were found "by chance" at autopsy. In all but six of the cases of tuberculous meningitis the diagnosis was proved at autopsy. Only 3 cases showed a negative result when the intracutaneous test dose was increased. Ten cases gave positive results on having the dose increased. Twice as many cases of miliary tuberculosis were missed by the X-rays as were correctly diagnosed. Apparently tuberculosis of the lungs in infants must be quite far advanced before it becomes visible roentgenographically. More than twice as many infants died during the second half of the first year as during the first half.—*Tuberculosis in Infants under One Year of Age, K. Merritt, Am. J. Dis. Child., September, 1929, xxxviii, 526.*—(*P. J. W.*)

Spontaneous Nontuberculous Pneumothorax in Early Infancy.—This condition in babies under two is not as rare as has been supposed. In adults tuberculosis is the principal aetiological factor, but in infants lobar and bronchopneumonia and whooping cough take precedence. A little girl of 16 months was brought to the hospital because of frequent convulsions. Three months previously she had had pneumonia involving the right upper lobe, with rapid recovery. On admission to the hospital at the time of the attack of convulsions, extreme dyspnoea with cyanosis supervened. Clinical and radiological examinations revealed complete right-sided pneumothorax, which was gradually absorbed, without liquid effusion. This type of case is especially rare in infancy, resembling more the adult form. Tuberculin tests were always negative. It is interesting that the convulsive seizures to which the child had been subject were in abeyance while the pneumothorax lasted. The previous attack of

pneumonia had had the same effect on the convulsions. A second case was that of a boy of eleven months, whose right-sided pneumothorax was as complete, without effusion, discovered quite by chance, on radiological examination made because of cough. This is the more common type in infancy. Forty-three other cases have been reported in French and other literature. The causes given are various, but lung abscesses, pneumonia, and whooping cough are the most common. The mechanism of production of the pneumothorax is either the opening into the pleura of a subpleural abscess, or the rupture of an emphysema-bubble at the periphery of a zone of consolidation. The prognosis depends upon the cause. If the pneumothorax remains dry, progressive recovery is the rule.—*Le pneumothorax spontané nontuberculeux dans la Première enfance, P. Lereboullet, M. Lelong et R. Even, Nourrisson, September, 1929, xvii, 257.*—*(P. J. W.)*

Tuberculosis in Infants.—The author reports 4 cases, and on the basis of these and those reported in the literature divides congenital tuberculosis into two forms: that in which placental infection occurred with primary changes in the periportal glands, and infection with primary changes in the respiratory tract originating either from the placenta by way of the *ductus venosus arantii* or bronchogenically. The frequency of congenital tuberculosis is given as about 5 per cent of infantile tuberculosis. The author reports 15 cases developing during the first year, in 7 of which the disease was healed. The prognosis is dependent upon whether the disease has become generalized; otherwise the children are in no worse condition than those infected at a later date.—*Über Säuglingstuberkulose, K. Scheer, Zeitschr. f. Tuberk., 1928, lii, 5.*—*(H. J. C.)*

Pulmonary Tuberculosis of Infants and Children.—Pulmonary tuberculosis in infants and children may be classified, according to the appearance and distribution of the infiltrations on the roentgenograph, as primary tuberculosis, glandular tuberculosis, hilum tuberculosis, miliary tuberculosis, and adult tuberculosis. Except in instances of quiescent hilar lymph-node tuberculosis in children, careful coöperative study of cases by the clinician and roentgenologist should result in few errors. Important for positive diagnosis are history of contact, positive intracutaneous reaction and symptoms—*Pulmonary Tuberculosis of Infants and Children, R. G. Karshner, Am. J. Roentgenol. & Rad. Ther., September, 1929, xii, 226.*—*(W. I. W.)*

Tuberculosis in Children.—It seems evident that if much is to be accomplished along preventive lines, it is necessary to do more than care for the cases with active disease. Any means making possible the finding of more active tuberculosis than is now being done would be of value; of even greater importance would be some practical means of preventing the development of active tuberculosis. The author outlines a plan which could be used on a wide scale for the prevention and control of tuberculosis. Tuberculin tests could be done on all school children. When a positive test is obtained, the preschool sisters and brothers should be tested. Also, the adult members of the family should be investigated in an attempt to find the source of spread. Should *BCG* prove of value as a preventive measure uninfected children suitable for its administration would incidentally be located. These methods would necessarily be the function primarily of health organizations. The next step would be the distribution of the care of these individuals. The aid of the practising physician is required. A record of the positive tuberculin test, of the state of the child's nutrition, and of the condition of the tonsils and teeth should be made, and a copy of this record should be taken by the patient to his physician. Adults in whom the disease is suspected should be referred to the private physician if they are able to have one. The private physician will in all probability coöperate if he understands that he is to assume responsibility for the care of these individuals. Signed permission from parents for the tuberculin test would have additional educational value. In instances in which the facilities are limited it seems preferable to do intensive work rather than to attempt to cover wide areas superficially.—*Tuberculosis in Children: A Plan for Prevention and Control, H. Casparis, J. Am. M. Ass., November 23, 1929, xciii, 1639.*—*(G. L. L.)*

Tuberculosis in Children.—Meningeal, respiratory and abdominal tuberculosis are the most common types of tuberculous disease in the first five years of life. A group of 254 cases of tuberculosis was studied and grouped in age-periods birth to 2 years, 2 to 5 years, and 5 to 12 years. The existence of healed or dormant tuberculous lesions is an important fact in later childhood and in later life. In the first two years, active pulmonary tuberculosis assumes a greater variety of forms, namely, tuberculous bronchitis, bronchopneumonia, acute caseous pneumonia, and a caseous tuberculous process at the hilum. Efficient prevention of pulmonary tuberculosis in the young child demands, first, the detection of phthisis in

the parent, and measures to guard against the danger of their close contact with the child.—*Tuberculosis in Early Childhood, C. McNeil, Brit. M. J., October 12, 1929, no. 3588, 655.*—(*W. I. W.*)

Pulmonary Tuberculosis in Children.—The difficulties in diagnosing intrathoracic tuberculosis in children are discussed. The clinical examination, radiological studies, and the tuberculin skin reaction are the three methods of investigation which are most likely to establish a correct diagnosis.—*The Diagnosis of Intrathoracic Tuberculosis in Children, B. Schlesinger, Tubercle, October, 1929, xi, 1.*—(*W. I. W.*)

Pulmonary Tuberculosis in Children.—The diagnosis of pulmonary tuberculosis is justified under the following conditions: (1) when physical signs indicate disease of the adult type and tubercle bacilli are found in the sputum or faeces; (2) when the signs or symptoms of miliary tuberculosis are confirmed by X-ray evidence; and (3) when pleurisy with effusion is present and is not due to any demonstrable cause.—*The Diagnosis of Pulmonary Tuberculosis in Children, W. Wood, Tubercle, October, 1929, xi, 8.*—(*W. I. W.*)

Roentgenographs of Chest in Children.—This study covers a period of one year (in Chicago), during which 171 pairs of lungs were examined postmortem. The patients were children up to thirteen years of age. No children with contagious disease or with open tuberculosis are admitted to the Children's Memorial Hospital, where the study was made. A careful history of every patient was taken, with repeated careful physical examinations and the necessary laboratory work. Roentgenographs were made at intervals during life. If the patient died a roentgenograph of the chest was taken postmortem, and finally X-ray pictures were made of the excised lungs after they had been inflated with air. In some instances opaque substances were injected into the circulatory system of the lungs, the bronchial tree, or both, and X-ray pictures were again taken. All the lungs were carefully dissected with the films before the examiner, in order that the pathological changes might be compared with the shadows present in the roentgenographs. It is impossible to formulate any standard for a normal chest from a roentgenographic standpoint. Interpretation of the X-ray pictures should go hand in hand with the history and clinical and physical observations and laboratory data. The hilar shadows and the linear markings are made up, for the most part, of the blood in the blood-vessels, and not of the bronchi. The rounded shadows of even density occurring in the inner third of the lung fields, as well as those found along the linear markings, are due to blood-vessels running parallel to the axial ray. Normal lymph nodes do not cast shadows. Hyperplastic lymph nodes, whether caseated or inflammatory, whether in the hilum or in the intrapulmonary tissue, cannot be recognized as such if they do not contain calcium. They will not cast shadows unless they are large enough to encroach on the pulmonary fields from the mediastinum or the hilum, or unless they are visible by contrast in the air-bearing pulmonary parenchyma. The size and shape of the hilar shadow are influenced not only by active infection, but also by the remains of previous infections. It may show wide variations in different roentgenograms and yet be within normal limits for the person examined.—*Interpretation of Roentgenograms of the Chest in Children Based on Observations at Necropsy, J. A. Bigler, Am. J. Dis. Child., November, 1929, xxxviii, 978.*—(*P. J. W.*)

Sinusitis and Tuberculosis in Children.—In children, especially, sinusitis may both simulate and aggravate tuberculosis. Tuberculous patients seem particularly susceptible to upper-respiratory infections. Sinusitis will result from the continued upper-respiratory infections, and then the secondary pulmonary changes in the central lung field may follow superimposed upon the tuberculous focus. The resultant pulmonary infection secondary to a sinusitis may present a picture clinically and roentgenologically so similar as to be at times very easily confused with that of juvenile tuberculosis. The routes of infection are: *1:* By way of the lymphatic vascular route, namely, submaxillary and retropharyngeal lymph nodes into the deep cervical and internal jugular nodes, then into the lymph ducts, great veins, right side of the heart, and then into the lungs by way of the pulmonary artery. *2:* By extension through inhalation. Not all cases of sinusitis are associated with secondary pulmonary changes. X-ray plates revealed lesions varying from the moderate hilum glandular enlargement with nodulation to central consolidation with interlobar pleurisy resembling the juvenile type of tuberculosis. A persistently negative tuberculin test is of course of the greatest value in ruling out tuberculous infection.—*Sinusitis and Tuberculosis in Children, H. A. Reisman, Arch. Pediat., November, 1929, xlvi, 667.*—(*P. J. W.*)

Pneumonia in Children.—Studies were made on 100 cases of lobar pneumonia in children in which the factors of age, sex, character of onset, febrile course, relapse, complications, blood count, roentgenological characteristics, lobes involved and recovery or improvement are noted. The order of single-lobe involvement was: right upper, 28.5 per cent; left lower, 28.5 per cent; left upper, 25 per cent; right middle, 14.3 per cent and the right lower 3.7 per cent.—*Lobar and Central Pneumonias in Children, F. B. Stephenson, Am. J. Roentgen. & Rad. Ther., June, 1929, xxi, 571.*—(*W. I. W.*)

Early Pulmonary Calcified Foci in Children.—In children, as in adults, there is a predisposition of the pulmonary apices to tubercle. The incidence in boys was 1.7 per cent and in girls 2.2 per cent of early apical lesions, a total of 45 cases being found. The greater incidence among girls was due to a greater exposure. The lesions are as a rule sharply defined and homogeneous; otherwise, in number, size and form there is no regularity. The general disposition of the lesions seems to indicate an early secondary stage in which the general and local allergic condition closely resembles the primary stage. Frequently the lesions can be identified with Puhl foci. Late pulmonary changes in the apices bear no relation to the earlier apical foci.—*Zur Frage der frühen pulmonalen Kalkherde im Schulalter, Insonderheit der frühen sekundären Spitzenherde, K. Nüssel, Beitr. z. Klin. d. Tuberk., 1928, lxix, 28.*—(*H. J. C.*)

Ten-Year Program for Children.—Since this plan was first put into operation in 1924 approximately 100,000 children have been examined in Massachusetts and many things learned. First, infection with the tubercle bacillus is not as common as we thought. At the age of five, the beginning of school life, 20 per cent are infected, at ten 28 per cent, at fifteen 35 per cent. Thus, there is roughly one point increase of infection with each year from five to fifteen. We have some figures for adults (nurses and teachers) which indicate only 50 per cent infection, a lower figure than was thought. Hence, when tuberculosis is suspected but not evident in adults we should give the tuberculin test as we do in children, for to be able to rule out tuberculosis in 50 per cent is very worth while. The use of the tuberculin test has also shown us that only about one-third of diseased cervical lymph nodes are tuberculous. Clinic procedure for the future will be revised on the basis of past findings, as follows: First the tuberculin test will be given to all the children. Next reactors will be X-rayed. Finally those showing pathological changes in the films will be examined and a careful history secured, after which, with all the findings on hand, the parents will be advised. This plan has already been tested at East Longmeadow, Massachusetts. About 80 per cent of parents consented to the tuberculin test, and the Pirquet test was done by two physicians on 430 children in three schools during the morning session. Three days later the results were recorded in all but those absent by one physician in three hours. An X-ray technician was then sent to X-ray the positive reactors. Interpretations have been made and careful physical examination of those showing pathological changes will follow, the mother preferably coming with the child. With this system twice as many children can be examined as to tuberculosis in one year with a smaller staff. The Massachusetts Tuberculosis League is sponsoring the examination of a large number of women in industry and it is suggested that the same method be followed. If only a physical examination is given many early cases of tuberculosis will be missed, or if it is made optional the 15 or 20 per cent that refuse examination will be the group which would show the most tuberculosis; hence arrangements should be made with employers to get all employees examined. A check-up of the death-rates for tuberculosis reveals rates of 280 per 100,000 in 1898, 210 in 1908, 146 in 1918, and 73 in 1928. Thus the reductions were respectively one-quarter, one-third, and one-half. Chadwick ventures to prophesy that in 1938 the death-rate in Massachusetts from all forms of tuberculosis will be under 40 per 100,000. —*The Ten-Year Program for Children—Progress and Plans, H. D. Chadwick, New England J. M., May 30, 1929, cc, 1154.*—(*A. P.*)

Juvenile Tuberculosis.—As the basis of the infiltrate occurring in the infraclavicular region it is pointed out that this consists of 1 to 3 small caseous nodules associated with collateral gelatinous pneumonic inflammation. The vascular system is considered responsible for the acinous focal lesions, regardless of whether they are productive or exudative-caseous in character. They have an interstitial location. The question of metastases or superinfection in the phthisis of puberty is left open. Juvenile tuberculosis appears to be a transition form from the secondary and tertiary stages of Ranke as expressed in the lymph-node changes. A diminished resistance of the endocrine system is indicated by the relatively frequent affection of the thyroid gland, to the extent

of 15 per cent in juvenile tuberculosis.—*Die pathologische Anatomie der juvenilen Tuberkulose (Pubertätsphthiseproblem), W. H. Stefko, Beitr. z. Klin. d. Tuberk., 1928, lxix, 278.*—(*H. J. C.*)

Acid-Fast Skin Infections of Cattle.—It is comparatively easy to detect acid-fast bacilli in tuberculous-like lesions of the skin, and the assumption would naturally be that these are bovine tubercle bacilli, were it not for the fact that they only exceptionally initiate disease in animals which are susceptible to mammalian bacilli. At present there exists no proof that bovine tubercle bacilli lose their virulence or their capacity to grow, through being in superficial lesions of cattle. Tuberculin, prepared from one strain isolated from such an area of disease, produced a remarkably high and uniform reaction when used as a test medium for animals with this disease. Skin-lesion cattle are sources of considerable trouble in the field. They usually react to tuberculin. What shall be done with them? The contention that the lesions may contain dead or avirulent bacilli should be given some consideration. This puzzling problem should be studied further.—*The Relation of Acid-Fast Skin Infections of Cattle to Bovine Tuberculosis and Other Acid-Fast Infections, J. Traum, J. Am. Vet. Med. Assn., March, 1929, lxxiv (n. s. xxvii), 553.*—(*H. S. W.*)

Bovine Skin Lesions.—This study comprises the investigation of 35 cattle as follows: 32 with cutaneous lesions, two with lesions of the teat, and one with cutaneous lesion and, at autopsy, disease of a cervical lymph node. Smears were always made, and parts of the tissue ground in a mortar and inoculated either directly or after digestion with sodium hydroxide. Acid-fast bacilli were found in 91.1 per cent of the lesions, although prolonged search was sometimes necessary. Acid-fast granules were frequently encountered. The period elapsing between inoculation of material into animals and the death of the latter averaged 192 days. Tuberculous lesions were produced in five rabbits, two guinea pigs and one chicken, all of which were tuberculosis-free at the beginning of the experiment. One-fifth of the cutaneous lesions studied produced lesions and, although the bacilli may have been somewhat attenuated, they were alive and had some virulence. All of the tuberculous animals died: none was killed. None of the animals in the experiment reacted to tuberculin.—*Studies with Bovine Skin Lesions, C. Elder, A. M. Lee, and T. R. Phelps, J. Am. Vet. Med. Assn., July, 1929, lxxv (n. s. xxviii), 51.*—(*H. S. W.*)

Lesions in Cattle Tuberculosis.—It has been shown that careful gross and histological search of reacting cattle at autopsy reveals tuberculous lesion in all but 0.25 per cent. In human pathology (and it must surely hold in bovine pathology) the ordinary autopsy methods are not satisfactory when one is looking for all lesions present. It is much better to harden at least the respiratory organs *in toto* and then cut them into thin slices not more than 2 mm. thick. Such a procedure yields a considerably higher incidence of infection than does the usual autopsy technique. This is not possible as a routine procedure, but as a study on a series of animals it might yield important information. Lesions both new and old, fresh and calcified, may be very small and may readily be overlooked. Of greater importance than the fact that some animals react without demonstrable lesion is the fact that some fail to react in the presence of demonstrable lesion.—*Lesions of Tuberculosis, M. Pinner, J. Am. Vet. Med. Assn., March, 1929, lxxiv (n. s. xxvii), 553.*—(*H. S. W.*)

Tuberculosis Eradication among Cattle.—The coöperative work between state and federal governments to eradicate tuberculosis has continued apace during the last year with about 12,000,000 tuberculin tests. In 1922 a very extensive survey revealed the fact that approximately 4 per cent of all the cattle were tuberculous. In 1928 that figure had been reduced to 2 per cent. On May 1, 1928, there were only 139 counties out of a total of 3,072 counties in the United States in which the percentage of tuberculosis was higher than 7 per cent. Of all the accredited herds (comprising 2,302,260 cattle) in the country, 5 per cent failed to pass on animal retest in 1925 and 3 per cent in 1928. Most of the reactors were from herds outside the modified accredited areas. From the experience with animal retesting, it is clear that most of the herds remain free from infection, once the latter is rooted out. Area work, that is eradicating by areas (for instance, counties), continues to be the most favorable and promising method. There continues to be a very real reduction in tuberculous cattle and swine as reported from the Meat Inspection Division through its inspection of slaughter houses. Careful attention has been given to the testing of cattle for interstate shipment. Much attention has been given to avian tuberculosis.—*Present Status of Progress of the National Coöperative Tuberculosis Eradication Campaign, A. E. Wight, J. Am. Vet. Med. Assn., March, 1929, lxxiv, (n. s. xxvii), 517.*—(*H. S. W.*)

North Carolina Cattle Tuberculosis-Free.—On October 1, 1928, tuberculin tests were completed on all the cattle in the 100 counties of North Carolina, and the state came into the modified accredited area. This is the result of ten years of active local work in eradication of tuberculosis. There is now no place in the state where dairy products may be sold from untested cows. Very little infection was found among native herds, but much more in pure breed herds, having been brought in by importation of breeding stock. Practically no tuberculosis was encountered in the poultry and in hogs. Of 621,403 tests applied, 2,079 reactors in 1,504 herds were found. The total cost for this work was $311,599 or something over fifty cents per head. Indemnity not exceeding $25.00 per head for grade cattle and $50.00 for pure breeds was paid. Testing will be kept up.—*North Carolina an Accredited Tuberculosis-Free State, W. Moore, J. Am. Vet. Med. Assn., March, 1929, lxxiv (n. s xxvii), 498.—(H. S. W.)*

Avian Tuberculin in Johne's Disease.—Normal, nonreacting guinea pigs after inoculation with avian tubercle bacilli promptly develop sensitization to avian tuberculin and to johnin. Similar animals after infection with Johne's bacillus develop such sensitiveness only slowly, but eventually they react to both avian tuberculin and johnin. Chickens infected with avian tubercle bacilli react readily and vigorously to johnin when injected into the wattle, but chickens infected with either human or bovine tubercle bacilli do not react to this product. A flock of 375 birds in which extensive tuberculosis was known to exist was divided into two groups. One of these was tested with avian tuberculin, the other with johnin. Of 168 chickens in the avian tuberculin group, 64 reacted. Of 195 that received johnin, 46 reacted. Reactions were quite alike in both groups. When the type of tuberculin was changed in the groups and all the fowl had been tested with both avian tuberculin and johnin, it turned out that altogether 137 reacted to avian tuberculin, 103 reacted to johnin, and 86 of these reacted to both products. Sheep infected with Johne's bacillus and later subjected to intravenous injection of johnin, became ill within a few hours and in some instances died. These latter had many gastric and other visceral haemorrhages. No evidence of Johne's disease could be seen. Control animals became more or less ill. Surviving animals, kept for months, were given a johnin test in the skin which was markedly positive, the control being negative. This was also true of small intravenous injections. Later when tested subcutaneously and simultaneously with johnin and avian tuberculin, they reacted equally strongly to both. They also reacted to intravenous injections of avian tuberculin. Calves artificially injected with Johne's bacillus were found to react with equal vigor to both avian tuberculin and johnin. This was also true of calves infected spontaneously. Avian tuberculin has been used for several months in testing (intravenously) herds known to be infected with Johne's disease, and a high incidence of reactions has been found. Subcutaneous test in natural infection with Johne's bacillus is not so regular in producing reactions.—*Johnin Versus Avian Tuberculin as a Diagnostic Agent for Paratuberculosis (Johne's Disease) of Cattle, W. A. Hagan and A. Teissig, J. Am. Vet. Med. Assn., June, 1929, lxxiv (n. s. xxvii), 985.—(H. S. W.)*

Spontaneous Tuberculosis in Guinea Pigs and Rabbits.—Under good hygienic conditions and proper caging it is extremely rare to see guinea pigs or rabbits develop tuberculosis spontaneously. In her thirty years' experience the author has only rarely seen it, and in these instances it is possible that the infected animals had been previously used for experimental purposes. In response to a questionnaire Theobald Smith, Park, Bieling, Calmette, Uhlenhuth and Schlossberger state they have never seen spontaneous tuberculosis in laboratory animals. Krause, Baldwin and Bruno Lange have seen it only three times. Opie, Sewall and Perla, in contradiction to this view, say they have seen it more frequently. Krumwiede and Gardner have not seen spontaneous tuberculosis develop in laboratory animals born of tuberculous mothers and left exposed in the same cage to infected animals. For practical purposes, therefore, in the diagnosis of tuberculosis from animal inoculation spontaneous infection should not be considered. *Conclusions:* Guinea pigs and rabbits can become spontaneously infected with tuberculosis. The type of bacillus with which they become infected depends on circumstances. The susceptibility of guinea pigs to artificial infection is, as is well known, very great. It is just the reverse by natural infection. Healthy guinea pigs which live with tuberculous animals only rarely become sick. The picture of spontaneous tuberculosis differs from that of inhalation and this fact is well known to tuberculosis workers. Pseudotuberculosis is sufficiently characteristic not to be confounded with tuberculosis by any bacteriologist. It is naturally necessary that the raising of the animals be

organized according to the best conditions of hygiene, and they should be well fed. Under these conditions, it is right to exclude the source of error of spontaneous infection in the diagnosis of tuberculosis by animal experimentation.—*La tuberculose spontanée chez les animaux de laboratoire, L. Rabinowitsch-Kempner, Ann. de Méd., April, 1929, xxv, 287.*—(*B. T. McM.*)

Latent Leprosy in Rats.—It has been shown by several authors that wild rats not infrequently are victims or subjects of an endemic disease, which grossly, histologically and bacteriologically completely resembles leprosy in human beings. Now comes a systematic search for acid-fast microörganisms (Hansen's bacillus is present in large numbers of the lesions of wild rats) in wild rats without gross lesions of leprosy. In this search such a bacterium has been cultivated on Musgrave and Clegg's medium 64 times from the spleen, testis, lymph nodes, lungs, and subcutaneous tissue of 24 out of 37 (65 per cent) wild rats showing no gross lesions of leprosy. From the tissues of three rats having well-marked leprous lesions, a similar microörganism was grown 17 times (100 per cent) and also from white rats inoculated with material from a wild leprous rat at various times from seven days to seven months before cultivating. While usually acid-fast on Musgrave and Clegg's medium, this microörganism on other media may assume a diphtheroid, streptococcoid, bacillary or branching filament form. These mutations are identical with those of an actinomycete of soil origin. The great prevalence in rats of latent infections with lepra-actinomycetes suggests a probable existence of a similar condition in man; it may explain the source and endemic nature of the disease. It is a subject which should be most thoroughly investigated.—*The Identity of Human Leprosy and Rat Leprosy, E. R. Walker and A. Sweeney, J. Prev. Med., July, 1929, iii, 325.*—(*H. S. W.*)

Results with BCG.—The authors have studied 14 infants, each of whom had received *BCG* during the first few days of life. Six of these had negative tuberculin tests, with no clinical or radiological signs suggesting tuberculosis. Of the six, three died of ordinary digestive or respiratory disorders. Necropsy on one showed no macroscopic tuberculous lesion. This infant, at the age of one month, lived for eight days with a tuberculous uncle. Another infant who died had a tuberculous father who visited him only rarely. The four others of the six tuberculin-negative infants were not known to have been exposed to tuberculosis. Eight infants had positive tuberculin tests. None came to the hospital for conditions which might have been thought tuberculous. Two of these infants presented no localized signs suggestive of tuberculosis. Six presented more or less definite clinical and radiological signs of hilar infiltration suggestive of tuberculosis. Six of the eight are dead. Of the three autopsied, two were negative for macroscopic tuberculous lesions. One had a caseous mesenteric lymph node which failed to infect a guinea pig. Only one of the eight gave a positive family history, having lived from three to four months with his tuberculous mother, though isolated. During life it is impossible to tell whether the *BCG* or tuberculous infection is responsible for the clinical syndrome, since either can provoke a positive tuberculin reaction. Inasmuch as nearly all the infants were not exposed to tuberculosis, it is impossible to determine the extent of protection by *BCG*. It is thus difficult to tell the degree of harmlessness, danger or effectiveness of protective ingestion of *BCG* at birth.—*Observations d'enfants ayant ingéré du BCG pendant les premiers jours de la vie, P. Nobécourt and M. L. Kaplan, Arch. d. med. d. enf., October, 1929, xxxii, 569.*—(*P. J. W.*)

BCG Vaccination in Animals.—Experiments designed to test the innocuity of *BCG* included the use of chickens, rabbits, guinea pigs and cattle. Six chickens inoculated each with 4.5 mgm. of *BCG* showed no sign of disease when examined,—two two months later and the remainder two years later. Six rabbits inoculated with same-sized dose did not develop any signs of tuberculosis up to two and one-half years after inoculation, when they were killed. Of 12 guinea pigs inoculated, one died at 30 months with chronic pericarditis; the other 11 were negative to tuberculin and normal at autopsy. Of 36 guinea pigs given 5 mgm. of *BCG* one died one year later with generalized tuberculosis, the lesions of which yielded tubercle bacilli and produced extensive tuberculosis when inoculated into other guinea pigs. The remaining 35 showed no signs of tuberculosis. It is possible that this may have been an instance of spontaneous tuberculosis. One bovine animal 17 months old was inoculated with 25 mgm. *BCG* monthly for six months and when killed three months after last inoculation, was free from tuberculosis. Further studies revealed the fact that guinea pigs inoculated intraperitoneally with *BCG* react to mammalian tuberculin for at least four months, but do not react to avian tuberculin. Old Tuberculin made from *BCG* is equal in potency to standard tuberculin. This strain appears to be a

mammalian strain which, although losing its virulence, has retained its antigenic and tuberculogenic properties. One hundred and fifty guinea pigs were used in an experiment planned to test whether *BCG* conferred immunity. The experiment revealed the fact that a relative immunity is established which is greater than that established by injections of dead tubercle bacilli; but it is *relative*, for all the immunized animals developed a generalized, if delayed, tuberculosis that was always fatal. Similar experiments in cattle showed but slight protection when the virulent dose was applied intravenously, and slightly more when applied subcutaneously. It is clear that *BCG* has no value as a vaccine in cattle.—*Studies Concerning the Calmette-Guerin Method of Vaccinating Animals against Tuberculosis, E. C. Shroeder and A. B. Crawford, J. Am. Vet. Med. Assn., April, 1929, lxxiv, (n. s. xxvii), 773.*—(*H. S. W.*)

Immunization with BCG.—It has been demonstrated that the *BCG* vaccine is not completely avirulent for animals, but it is of a very low virulence. The mass vaccination of newborn children carried out in France is peroral, and these infants rarely become tuberculin positive. This is one of the reasons for the opinion that little has as yet been proved of the immunizing effect of peroral *BCG* vaccination. It has been reported that some children vaccinated subcutaneously developed tuberculin sensitiveness. If this should be constant, and the children do not suffer injury, this method of vaccination is to be preferred, and the author has experimented with intracutaneous vaccination for about 18 months, inoculating only those children whose parents or other relatives were tuberculous. If there has been the slightest chance of infection, the child should be given repeated tuberculin tests before inoculation; and this should not be done until the child has reacted negatively after 6 or 7 weeks hospital quarantine. Intracutaneous injection of from 0.1 to 3 mgm. of O. T. is preferable to the Pirquet test. After observation, tuberculin-negative children are inoculated in the outer surface of the thigh. Here a small nodule persists for several days, then disappears; a few weeks afterward, new infiltration appears, suppurates, perforates the cutis, and then heals spontaneously in from 6 weeks to 3 months. In certain cases, however, the author observed caseous degeneration and fistula-formation of the regional lymph nodes, with *BCG* demonstrated in the pus, proving that it does not always lie in the lymph nodes merely as a saprophyte, but is more virulent for man than was originally considered in France. These regional lymphomata probably did not harm the children, as they healed perfectly in a few months, after curetting. Experiments as to proper dosage, however, showed that with a dose of 0.1 mgm. only one of 27 inoculated children developed regional lymph-node suppuration, and 25 reacted positively to 1 mgm. of O. T., whereas much smaller dosages of *BCG* proved insufficient to produce allergy. There is a definite relationship between dosage and the incubation period in weeks. After 16 weeks the author has not as yet seen any infant become sensitive. In no case did tuberculin allergy develop when there was no demonstrable local reaction to inoculation. The majority who became sensitive showed suppuration of the primary focus. The regional lymph nodes were enlarged in several and all of these reacted to tuberculin. One child reëxamined one year after the onset of allergy, still reacted to 1 mgm. of tuberculin. The author has so far seen 33 children become tuberculin reactors after inoculation, and the majority have since been living in their contaminated homes; he does not consider the vaccination successful unless there is a definite reaction to tuberculin, and until this time the child is kept free from exposure. Because the majority of children inoculated intracutaneously do not become reactors before from 5 to 7 weeks, it would seem that a quarantine period of only one month for perorally vaccinated children, as advocated by Calmette, is too short. Fluoroscopic examination every six months of the vaccinated children in their contaminated surroundings, has so far failed to reveal any enlargement of the bronchial lymph nodes. Of 35 vaccinated children observed more than six weeks, 8 have had to be reinoculated before allergy occurred, the second dose being as large as the first. No suppuration of the regional lymph nodes developed after reinoculation, and the incubation period was the same as in children vaccinated only once. The reinoculation is made in the opposite thigh, and when suppuration begins here the original indolent nodule simultaneously enlarges and at times suppurates. The author concludes that there exists a great individual variation in susceptibility in infants to the *BCG* virus. From observing inoculation results from the same dose of *BCG*, when in some cases there is almost no infiltration and no allergy, and in others local abscess-formation, it also seems probable that the *BCG* can vary in virulence to a certain degree. These variations should be still greater in peroral vaccinations, since there is always uncertainty as to the amount

absorbed. Comparative experiments by the author with peroral administration of 30 mgm. and intracutaneous inoculation of 0.1 mgm. convince him as to the certainty, rapidity and ease of observation of the latter method in producing allergy, as compared with the uncertain results of the former method.—*Intradermal Vaccinations with BCG Virus: Preliminary Note, A. Wallgren, J. Am. M. Assn., December 15, 1928, xci, 1876.*—(*G. L. L.*)

Immunization with BCG.—Experiments in guinea pigs revealed irregular results from *BCG* bacilli, and the authors conclude from these experiments that *BCG* has no immunizing effect since all the animals developed a severe generalized tuberculosis and only one lived longer than the control.—*Über Immunisierungsversuche mit dem BCG-Stamm Calmettes. II Mitt., H. Chiari, E. Nobel and A. Sole, Zeitschr. f. Tuberk., 1928, li, 354.*—(*H. J. C.*)

Immunization of Cattle with BCG.—It has already been demonstrated (by the authors) that a weakly virulent bovine tubercle bacillus does not protect cattle against naturally acquired tuberculosis when the latter had previously been inoculated intraperitoneally with one gram of the strain. The strain is known as tubercle bacillus no. 18. Calmette's claims of protective results from the injection of *BCG* are therefore surprising. In order to reexamine this question, 24 calves from four to six months of age were tested with tuberculin and used as follows in experiments: Six of these were given 100 mgm. of *BCG* in a 10-cc. suspension. All developed a nodule as large as a walnut or larger at the site of inoculation in from three to fourteen days. This reaction was still present in three at the end of a year and was the size of a bean, but it had disappeared at the time of slaughter 15 months after inoculation. These animals showed no other reactions. A second lot of six was inoculated with 100 mgm. of the relatively avirulent strain of tubercle bacillus no. 18 (which was isolated by v. Behring in 1902). This culture leads usually to regressive, healing disease but occasionally also leads to death. These animals ran the same course of lymph-node enlargement, etc., as those injected with *BCG*. A third group of 6 animals was given intraperitoneal injections of one gram of culture no. 18. These never fell ill, and they grew normally. The fourth group embraced 6 normal control animals. Each group was exposed to three tuberculous cattle in intimate contact in rotation for 10 months. Of the *BCG* group four eventually had evidence of lymph-node tuberculosis at autopsy and two were free of such evidence. The same is true with the lots of animals inoculated with 100 mgm. and those with one gram of strain no. 18. All the control animals developed tuberculosis. It is clear from these experiments that the Calmette strain does not offer an absolute protection.—*Vergleichende Schutzimpfungsversuche gegen Rindertuberkulose mit schwach virulenten Rindertuberkelbazillen (Kultur B.C.G. Calmette Guérin and Kultur T. B. 18 Uhlenhuth), Uhlenhuth, Müller and Hillenbrandt, Deutsche med. Wchnschr., September 13, 1929, lv, 1535.*—(*H. S. W.*)

Experiments with BCG in Cattle.—Sixty nontuberculous cattle were divided into three groups of twenty each. One group was inoculated with *BCG*, one with a suspension of killed tubercle bacilli, and the third with virulent tubercle bacilli for controls. Calves and cows were included in each group. After six months the animals were kept in close contact with each other for one and one-half years, when 57 per cent of the calves and 87 per cent of the cows in the *BCG* series had developed tuberculosis. This percentage closely paralleled that of the control series. It appears from this that the Calmette strain conferred no immunity whatever upon the cattle into which it was introduced.—*A Two-Year Experiment with the "Calmette" Method of Vaccination, W. P. Larson, and W. A. Evans, J. Am. Vet. Med. Assn., March, 1929, lxxiv, (n. s. xxvii), 581.*—(*H. S. W.*)

BCG Immunization.—The author is of the opinion, after careful study of the literature and after personal investigations and experiments, that *BCG* should be administered to infants born to parents with open pulmonary tuberculosis. With further proof of the harmlessness and efficiency of the vaccine, it may be found that all newborn infants should be so vaccinated. The author's experiments are corroborated by the experiments of practically all investigators; namely, that living bacilli are necessary to produce immunity through inoculation. He cites data in connection with the inoculation in 1909 of five children with increasing numbers of an attenuated human tubercle culture, of which 120 bacilli were necessary to infect a guinea pig. After twenty years these adults have no trace of tuberculosis. While some of the favorable reports emanating from Calmette and his coworkers have been severely criticized on the ground of inadequate control, it is a conspicuous fact that practically all independent reports coming from different

countries have been favorable to the use of *BCG.—Immunization by Bacillus Calmette-Guérin, G. B. Webb, J. Am. M. Assn., November 9, 1929, xciii, 1459.—(G. L. L.)*

Immunization of Monkeys with BCG.—*Macacus rhesus* monkeys were given immunizing injections of 30–50 mgm. of *BCG* subcutaneously without producing any particular reaction. Intracutaneous superinfection with virulent bovine or human tubercle bacilli, 34 to 46 days later, in the region of the eyebrow produced lesions (0.05 mgm. bovine) without tendency toward progression while the same lesion in nonimmunized animals was progressive. All the *BCG*-treated animals, in distinction to the controls, revealed absence of widespread tuberculosis in the internal organs. Histologically the local changes also differed from those in the controls. It is concluded that the *BCG* virus, which is harmless, produces a definite immunity in monkeys.—*Über Immunitätsstudien bei Affen nach Tuberkulose-Schutzimpfung mit BCG, F. Gerlach and R. Kraus, Centralbl. f. Bakt., I. Orig., 1929, cx, 179 and 187.—(H. J. C.)*

Virulence of BCG.—Massive injections, up to 25–500 mgm. *BCG*, into guinea pigs resulted in leucocyte-rich lesions which did not resemble typical tubercles and which attained a height of reaction after 20 days, completely disappearing in 5 months. The *BCG* strain could be isolated on artificial media up to 6 weeks after inoculation into animals, but it was innocuous when injected into guinea pigs. The application of cold, inhalation of sawdust, vitamine starvation, sanocrysin, diphtheria-toxin intoxication, mixed infection, and pregnancy during the 18th to the 169th days after treatment subcutaneously with 25 mgm. *BCG* had no influence upon the type or course of the infection.—*Versuche an Meerschweinchen über die Virulenz des BCG-Stammes, Insbesondere über die Frage der Beeinflussbarkeit dieser Virulenz durch methodische Schädigungen der Versuchstiere, L. Lange and K. W. Clauberg, Centralb. f. Bakt., I. Orig., 1929, cx, 183 & 187.—(H. J. C.)*

Tissue Cultures of BCG.—The infection of tissue cultures from 10 human embryoes, on rabbit plasma and embryonal extract, with *BCG* revealed no destruction of the tissue cells. There was inhibition of growth and destruction of the cultures of bacilli as well as an inhibition of the tissue growth by the bacilli. There occurred a phagocytosis of the *BCG* by wandering and tissue histiocytes and syncytial giant cells of the Langhans type. On the other hand, virulent tubercle bacilli produced a rapid necrosis in the explant, while weakly virulent bacilli produced genuine tubercles and signs of degeneration, especially in the neighborhood of the bacillary colonies. Even in explants with leucocytes there was absent any evidence of a necrotizing action of the *BCG* on the agranulocytes. In this case there was also noted the formation of Langhans giant cells and phagocytosis of the rods by "polyblasts" and "resting wandering cells."—*Züchtung von Geweben und Leukocyten des Menschen mit Tuberkelbacillen Calmettes (BCG), A. D. Timofejewsky and S. W. Benewolenskaja, Virchow's Arch., cclxviii, 629.—(H. J. C.)*

Corneal Passage of BCG.—The proof of a perpetual loss of virulence of *BCG* has not been demonstrated. The solution of this problem is attempted by introducing the microörganisms into the cornea because its avascularity increases the possibility of the bacilli developing in an undisturbed fashion away from the protective powers of the body, and this tissue offers the advantage of bearing frequent observation. There was injected 0.001 to 0.000,01 mgm. into the cornea of rabbits and guinea pigs, a strain being used that was obtained directly from Calmette and a second strain secured indirectly. Both cultures gave parallel findings. With 0.001 mgm. specific changes were noticed after 10 days and they resembled those obtained with virulent tubercle bacilli, including infiltration that resulted in abscesses and perforation. Ziehl preparations revealed numerous tubercle bacilli, which were cultivated in pure culture on egg medium from the lesion. The experiments revealed that passage at favorable intervals resulted in a more rapid development in subsequent animals.—*Die Fortzüchtung wenig virulenter Tuberkelbacillen, insbesondere des BCG, in der Cornea, O. Kirchner, Beitr. z. Klin. d. Tuberk., 1928, lxix, 181.—(H. J. C.)*

Protective Inoculation with Killed Tubercle Bacilli.—In 1924 quite a number of noninfected children who were living in a tuberculous environment were injected with doses of killed tubercle bacilli in the manner suggested by Langer. Originally the inoculations were done intracutaneously and were repeated. Later, single intramuscular injections of 0.3 cc. suspension were done. No signs of local or general reaction followed the intramuscular injection, which was applied to ambulant cases only. Strong tuberculin reactions developed in all in from one to five months. Allergy has continued for five years. Whether continuance of

allergy has come about from repeated infections from the homes or from the original inoculation with dead bacilli is open to question. Some of the children have shown a gradual weakening of allergy, but factors other than diminution of strength of the original injection may cause this. Before the question of whether allergy is associated with immunity can be answered, certain conditions such as the following must be fulfilled: (1) there must be sufficient duration of observation; (2) exposure of protected children to natural infection; (3) determination of morbidity and mortality in vaccinated and nonvaccinated children living under the same epidemiological and social conditions. One can not yet give a conclusive answer because (1) the number of ill children and the time is insufficient, and the number of children suitable for such inoculations is much smaller than is generally thought; (2) parental objection or lack of coöperation also prevents a conclusive answer. Since 1924, 44 children up to age six have been injected. Of these, 10 died of intercurrent diseases, the remaining were exposed in homes. All are free from tuberculosis after an exposure of four years (four children), three years (six children), two years (eight children), one and one-half years (six children), one year (the rest). The children were examined, skin-tested, and X-rayed every six months, and only one (exposed continuously for one and one-half years to a diseased mother) showed any disease, and this was a small, early lesion in the X-ray plate. The child was asymptomatic. Results decidedly favor this method of protection, although the numbers are too small for statistical analysis. Langer's method seems to protect children, especially in the first two years of life. Nonvaccinated children show a mortality rate which varies from 7 to 30 per cent and no dependable data are available because the degree of exposure, duration of illness, etc., are not always known and may vary a great deal. It will take years to be able to give definitely a comparison between these treated and nontreated children.—*Weitere praktische Ergebnisse mit der Tuberkuloseschutzimpfung nach Langer, I. Zadek and M. Meyer, Deutsche med. Wchnschr., September 27, 1929, lv, 1630.*—(*H. S. W.*)

Vaccination with Killed Tubercle Bacilli.—In 1924 Langer first published the results of his inoculation experiments with dead tubercle bacilli on ten children whom he observed for a period of nine months. Inasmuch as dead bacilli cannot become virulent, Langer's method is safer than the method of inoculation with *BCG*. That the dead bacilli can produce allergy was shown (Fedders) by the fact that in from twenty days to five months after their injection tuberculin tests become positive. Langer himself vaccinated 147 guinea pigs, and three months later inoculated 14 of them with live tubercle bacilli. Ten guinea pigs were used as controls. The controls died on the average within 3.55 months; the previously vaccinated guinea pigs lived on the average of 6.52 months. More recently (Zadek and Meyer) 15 children were inoculated with dead bacilli, and after 2 months developed positive tuberculin tests, and after three years' contact with open tuberculosis have remained perfectly well.—*Prof. Langer's Method of Vaccination against Tuberculosis. A Review of the Recent Progress Made in Germany in Vaccinating Infants with Dead Tubercle Bacilli, B. M. Gasul, Arch. Pediat., July, 1929, xlvi, 459.*—**(*P. J. W.*)**

Formalin as Disinfectant in Tuberculosis.—Small pieces of wool treated with tubercle bacilli were placed in a 1 per cent formaldehyde solution for two hours and then placed subcutaneously in guinea pigs. Sixteen animals thus treated remained free from tuberculosis while all the controls died of severe disease. The resistance of tubercle bacilli in moist sputum towards formaldehyde water vapor is limited to the use of high formaldehyde concentration. At a temperature of 62°–63° virulent tubercle bacilli lost their infectiousness in two hours while 58°–60° required three hours.—*Disinfektion mittels Formaldehyd in wässeriger Lösung und in Dampfform bei Tuberkulose, E. Bergin, Zeitschr. f. Tuberk., 1928, li, 306.*—(*H. J. C.*)

Development of Pulmonary Tuberculosis.—This disease has usually been described as being of a slow, insidious onset, with cough, haemoptysis, indefinite malaise, night-sweats, an intermittent low-grade pyrexia, and progressive loss of weight as the chief symptoms. It has also been thought almost invariably to have its initial lesion in the apical region. During recent years a great deal of evidence has been adduced to suggest that the old teaching is often erroneous, and that the disease is by no means always insidious; neither is the initial lesion always situated in the apical region. A series of eight cases are submitted as illustrations of "early infiltration." The salient points in these cases are (1) the onset is definite, and often acute; (2) physical signs are present below the clavicle, the only constant sign being crepitations; (3) the radiological appearance is of an area of

infiltration, varying in size from 2 to 10 cm. in diameter, and situated in the infraclavicular region; and (4) the general condition of most patients is extremely good. The lesions should not be mistaken for acute bronchopneumonic phthisis. In such cases the patient is usually, if not always, extremely ill. Early infraclavicular infiltration may spread to involve the apical region or may heal within a few months to leave only a small scar.—*The Development of Pulmonary Tuberculosis, with Special Reference to "Early Infiltration," H. V. Morlock, Lancet, July 13, 1929, ccxvii, 60.*—(*H. McL. R.*)

First Stage of Tuberculosis.—The author views tubercle-formation as having a preliminary inflammatory stage, and in support of this he points to the perivascular lymphatic nodules in the guinea pig's lung which he noted in intravenously infected animals. He designates these as inflammatory accumulations of cells without giant-cell formation and without necrosis, but revealing tubercle bacilli. Likewise he notes the small areas in the guinea pig's liver, designated as inflammatory foci, which have become partly necrotic and which demonstrate the transition from inflammation to necrosis. In the areas of necrosis tubercle bacilli were found. In addition, a specimen of phthisical lung examined indicated, according to the author, the chain of evidence for considering that tuberculosis begins as an ordinary inflammation followed by necrosis and finally accounting for the protracted course of the tuberculous structure.—*Das erste Stadium der Tuberkulose, F. Jessen, Beitr. z. Klin. d. Tuberk., 1928, lxix, 188.*—(*H. J. C.*)

Tuberculous Chests.—Studies were made to determine the contour of the normal and the tuberculous chest. The average length-width index was 78.4 per cent in the normal chests of 443 students. In a series of 184 tuberculous men, the length-width index was 77.1 per cent. The tuberculous chest appears to be deep, round and narrow and the healthy chest tends to be flat and wide.—*Further Observations on the Contour of Normal and of Tuberculous Chests, S. A. Weisman, Arch. Int. Med., July, 1929, xliv, 29.*—(*W. I. W.*)

Pathogenesis of Pulmonary Tuberculosis.—The author, in spite of the more modern teachings, prefers to use the term apical tuberculosis for the value this may give. Many of the early cases of tuberculosis show physical signs in the apical region and thus urge early treatment. He believes it impossible to distinguish two types of development of the tuberculous reinfection. There are many vague conditions related to the apical and early infiltrations which may confuse the issue.—*Zur Pathogenese der Lungentuberkulose, O. Pischinger, Beitr. z. Klin. d. Tuberk., 1928, lxix, 133.*—(*H. J. C.*)

Ranke's Classifications.—The author sketches anew the Ranke teachings, and points out that the course of the tuberculosis and the reaction of the organism are not always regularly determined by the relation of the first infection. The fact that the allergic course can take a reverse route indicates that nonspecific intercurrent factors can be of significance. The individual constitution of certain groups of non-infected individuals also accounts for the acute and childhood forms of secondary tuberculosis. The biological change does not always determine the course and fate of tuberculosis but this is rather associated with the constitutional transition which may be hereditary.—*Zur Stadienlehre K. E. Rankes, K. Lydtin, Zeitschr. f. Tuberk., 1928, li, 23.*—(*H. J. C.*)

Genesis of Early Infiltration.—Attention is focused upon two questions in the determination of the genesis of the early infiltration and the origin of chronic pulmonary tuberculosis. The first calls attention to the fact that the origin of chronic pulmonary tuberculosis is most frequently to be sought in a massive earlier infection upon which a superinfection acts in an allergic fashion, and that the pneumonic infiltrate develops from a slowly spreading focus. Against the view that the infraclavicular infiltration indicates an unquestioned superinfected massive inhalation seeding is the fact that the usual aspiration deposits are located in the middle and lower lung portions and reveal themselves as fibrous proliferative formations.—*Beitrag zur Frage nach der Genese des Frühinfiltrats und des Ursprungs der chronischen Lungentuberkulose, E. Fraenkel, Zeitschr. f. Tuberk., 1928, li, 34.*—(*H. J. C.*)

Significance of Early Pulmonary Infiltration.—An extensive study of 4,172 roentgen films revealed 137 apical tuberculosis and 390 early infiltrates. Among the 390 early infiltrates there were only 192 fresh processes. The early infiltrate is considered more important as initiating pulmonary tuberculosis than the apical condition. Many of the earlier observations concerning the early infiltrate are verified.—*Die Bedeutung des Frühinfiltrates für die*

Klinik der Lungentuberhulose des Erwachsenen und ihre Fürsorge, G. Frischbier and H. Beckmann, Zeitschr. f. Tuberk., 1928, lii, 141.—(*H. J. C.*)

Early Infiltration.—In search of the early infiltration the author examined about 5,000 individuals considered suspicious of early tuberculous disease. Only 15 cases of early infiltration were found, most of them tending toward progression. It is concluded that the early infiltration is a very transient manifestation, with a focus that rapidly liquefies or rapidly disappears, and the more stabilized older tuberculous foci are therefore more frequently found. The importance of the X-ray in finding such cases and serial examinations of groups of people are stressed.—*Auf der Suche nach dem Frühinfiltrat, H. Braeuning, Zeitschr. f. Tuberk., 1928, li, 1.*—(*H. J. C.*)

Incipient Tuberculosis.—Infraclavicular infiltrations are usually considered to occur in previously infected individuals. But this is not always the case. The author has shown in previous communications that in his material in Norway a majority of individuals acquire tuberculin allergy between the ages of 15 and 25. The present report is based on studies on 581 young women who entered a nurses' training school since January, 1924. Of 282 tuberculin-positive persons, five developed tuberculous disease (2 pleuritis, 3 erythema nodosum); of 299 tuberculin-negative nurses, 66 developed the disease (12 pleuritis, 15 erythema nodosum, 13 erythema nodosum and pulmonary infiltration, 4 erythema nodosum and pleuritis, one erythema nodosum and pulmonary tuberculosis, 15 pulmonary infiltration, 5 pulmonary tuberculosis and one costal caries). In all the tuberculin-negative nurses, no serological or roentgenological evidence for a tuberculous infection could be found. Three patients are reported somewhat in detail; they all developed the roentgenological evidence of pulmonary infiltrations one to three months after starting work in the tuberculosis department. It is concluded that a latent infection in childhood is only "very rarely" the cause of tuberculous disease at early adult life. Active tuberculosis is usually the immediate result of a primary infection. The first manifestation is frequently a primary infiltration of the lung and it may appear as infraclavicular infiltration. Erythema nodosum and pleuritis are commonly manifestations of the primary tuberculous pulmonary infiltration.—*Tuberculosis Incipiens, J. Heimbeck, Klin. Wchnschr., June 25, 1929, xii, 1206.*—(*M. P.*)

Apical Tuberculosis.—Roentgenographs were examined in 1,000 cases of pulmonary tuberculosis over a period of five years, and the observations correlated with the clinical history and course of the disease in each case. In 107 cases the earliest localization was in the infraclavicular region, and in 60 cases above the clavicle. It was found that 31.7 per cent of patients with apical lesions survived ten or more years after the first symptoms of the disease appeared; some even more than twenty years. In the infraclavicular group, only 1.8 per cent lived that long. One out of three with apical lesions survived more than five years, as against one out of ten with infraclavicular infiltrations. Careful histories revealed that 30 per cent of those with infraclavicular lesions felt sufficiently ill to seek medical advice before they reached the age of 20, as against only 13 per cent of those having apical lesions. Only 11 per cent of the former group noted the first symptoms after the age of 35, as against 32 per cent with apical lesions. Open tuberculosis was found in only 15 per cent of apical, as against 66.4 per cent of infraclavicular lesions. Patients with apical tuberculosis generally have less marked constitutional symptoms, especially fever. Bleeding occurs in both groups, but those with lesions below the clavicle are more apt to bleed copiously. The conclusion is inevitable that apical tuberculosis usually has a benign course, and in many cases there is no need for prolonged and costly treatment, whereas infraclavicular tuberculosis is of greater clinical significance and requires immediate attention.—*The Benign Course of Apical Tuberculosis, M. Fishberg and A. Shamaskin, J. Am. M. Ass., July 13, 1929, xciii, 108.*—(*G. L. L.*)

Apical and Subapical Tuberculosis.—Of the 60 to 90 per cent of tuberculous foci observed in routine necropsies, 30 to 60 per cent are found to have been obsolete. The problem has been to differentiate these benign lesions from the numerous others that are progressive. Lesions limited to the apex of the lung only exceptionally develop into active and progressive disease. Those lesions which are responsible for the initial symptoms of the disease are located below the clavicle, while the apices remain free from pathological lesions for some time. Among the patients at the Bedford Hills Sanatorium, less than 2 per cent with subapical lesions had been sick for ten years or more, as against 32 per cent of those with apical lesions. The main contingent of progressive cases, leading to serious illness and ultimately to a fatal issue, is derived from the subapical group.—*Apical and*

Subapical Tuberculosis, J. M. Fishberg, Brit. M. J., August 24, 1929, no. 3581, 331.—(W. I. W.)

Fatal Sequellae of Apical Tuberculosis.—Four patients are briefly reviewed who had the physical signs of a healed tuberculous process in one apex. They all developed rapidly fatal pulmonary disease following a small haemorrhage apparently caused by strenuous physical exercise. Two of the patients died of diffuse bronchopneumonia, and two of miliary tuberculosis. It is concluded that haemorrhages in healthy-appearing individuals are always caused by tuberculous processes, frequently in the right apex, and that patients with such lesions should be warned against physical exertion.—*Lungenspitzentuberkulose, Jahrelang latent Geblieben, Kann unter Umständen plötzlich lebensgefährliche Folgen haben, C. Bäumler, Klin. Wchnschr., August 6, 1929, viii, 1493.—(M. P.)*

Acute Infraclavicular Focus.—The author reports on 6 cases of infraclavicular tuberculosis originating from progressive phthisis at the apex. He concludes that the development of the acute infiltration from an apical focus can be demonstrated, and that a caseous pneumonic focus with a parafocal inflammatory reaction is the basis of the infiltration.—*Zur Frage der akuten Form der Lungentuberkulose, A. Brecke, Zeitschr. Tuberk., 1928, li, 97.—(H. J. C.)*

Non-Apical Adult Phthisis.—The author reports on 21 cases observed during the past three years of beginning adult tuberculosis aside from that occurring in the apices. The diagnosis can only be made in most cases by roentgen examination, since the clinical symptoms are frequently only slight. The prognosis appears to be good in most cases. The development of apical tuberculosis from infraclavicular foci is significant. The "early infiltrates" are viewed as a reinfection which can be exogenous as well as endogenous. In most cases they occur during the second-stage allergy. The early infiltrations become fibrotic fields or they tend to liquefy and seed into daughter lesions. Treatment consists in the protection against all stimulation and the use of collapse therapy in cases in which there is no retrogression or liquefaction of lesions. Early sanatorium treatment is advised.—*Zur Diagnose, Prognose und Therapie der zu Beginn und im Verlauf der Erwachsenen-Phthise ausserhalb der Lungenspitzen auftretenden isolierten Krankheitsherde, J. E. Kayser-Petersen, Beitr. z. Klin. d. Tuberk., 1928, lxix, 10.—(H. J. C.)*

Tuberculosis of Lower Lobes.—While involvement of the lower lobe alone in pulmonary tuberculosis is not very common, it is not as rare an occurrence as once thought. Laennec was of the belief that in most, if not all, cases of pulmonary tuberculosis the primary lesion is in or near the apex. The general opinion has also existed that the development of the lesion is downward. More recently it has been pointed out that tuberculous lesions may have their origin in the lower lobe and progress upward. Several theories are given briefly as to why the primary lesion in pulmonary tuberculosis develops in one locality or another. It is suggested that perhaps lower-lobe tuberculosis develops following the rupture of a tuberculous hilum node into a bronchus or a large blood-vessel, with resulting massive infection of the lower lobe. This type of disease is regarded as "a juvenile type of pulmonary tuberculosis in an adult." It is also asserted that lower-lobe tuberculosis is usually of an exudative type with a tendency to caseation and excavation. Apical involvement is thought more benign in its behavior, with a greater tendency to heal, not by excavation, but by fibrosis. Two cases of lower-lobe tuberculosis healed by artificial pneumothorax are reported. *Conclusions:* Lower-lobe pulmonary tuberculosis without apical involvement is a rare condition. The clinical course and the pathological and X-ray findings of this condition are analogous to those of the juvenile type of the disease. Waiting for positive sputum, although essential in confirming the diagnosis, might endanger the patient's chance of recovery. The treatment *par excellence* is artificial pneumothorax, if instituted early in the disease.—*Lower Lobe Pulmonary Tuberculosis, M. Jacob, Med. J. & Rec., January 2, 1929, cxxix, 32.—(H. McL. R.)*

Lower-Lobe Bronchogenic Phthisis.—There are certain forms of bronchogenic phthisis, or the *phthisis fibrocaseosa Neumann*, which start in the tips of the lower lobe. These forms are difficult to determine by physical methods and the ordinary dorsal-ventral X-rays do not give exact pictures, since the infiltration of the lower lobe appears to originate from the hilum. On the basis of section and roentgen pictures the author assumes that the lower-lobe process is a primary one. These primary lower-lobe conditions appear to heal spontaneously and if cavity-formation has occurred they remain stationary for a long time. The majority of cases, if untreated, have a serious prognosis since the material can spread apicalward to the undiseased or

diseased side. The preferred treatment is pneumothorax.—*Über die Formen der bronchogenen Phthise mit Beginn im Unterlappen, R. Pohl, Beitr. z. Klin. d. Tuberk., 1928, lxix, 229.*—(*H. J. C.*)

Basal Tuberculosis.—Basal pulmonary tuberculosis is frequently associated with tuberculous lesions elsewhere in the body. Forty-four cases are reported; 34 of these patients are dead. Autopsies were performed on 17, and they all had extrapulmonary tuberculous lesions.—*Basal Tuberculosis, K. Dunham and V. V. Norton, Am. J. Roentgenol. & Rad. Ther., May, 1929, xxi, 459.*—(*W. I. W.*)

Liquefaction in Tuberculosis.—Römer was the first to draw attention to the rôle which allergy plays in the process of liquefaction; he described the production of many small cavities in superinfected animals. It has been claimed since that they occurred as consequence of the very small dose in the first infection and that they were independent of allergic phenomena. It was attempted to arrive at a solution of the problem by implanting caseous tissue from human bodies subcutaneously in normal and in allergic animals. The implanted tissue was removed 5 and 10 days after implantation. After 5 days the implanted tissue was well preserved in the normal animals, but surrounded by pus; in the allergic animals, it was white, shrunken and pus-like in appearance. In the former case the only alteration was a marginal leucocytic infiltration. In the latter case the entire transplant was massively infiltrated by pus cells. The only indication of liquefaction in the normal animals was represented by small areas in which tubercle bacilli had apparently proliferated. The centres of liquefaction in the allergic animals showed dense leucocytic accumulations around groups of tubercle bacilli. It is, then, possible to distinguish two types of liquefying processes in tuberculosis: the normergic type, characterized by local proliferation of tubercle bacilli; and the allergic type, characterized by leucocytic infiltrations, regardless of the local number of bacilli.—*Zum Wesen der tuberkulösen Erweichung, W. Pagel, Klin. Wchnschr., July 16, 1929, viii, 1352.*—(*M. P.*)

Tuberculous Cavities.—Before the formation of the so called classical cavity, the tuberculous lesion passes through successive phases which one may define as different degrees of evolution. Two of these phases are sufficiently characteristic from the anatomical standpoint and are stabilized over a long enough period to constitute a separate clinical entity, each with its own individual symptoms. The first phase is characterized radiographically by an indistinct circular outline with a blurred interior. It is marked clinically by an absence of expectoration. The second phase is characterized by the appearance of a well-defined annular shadow, and is accompanied by the expectoration of mucopurulent material containing tubercle bacilli. Anatomically the walls are composed of soft pulmonary tissue. By the third degree, or phase, is meant a cavity of larger dimensions, appearing radiographically perhaps as a clear circle and anatomically characterized by thick fibrous walls isolating the cavity proper from surrounding tissues. The importance of recognizing different degrees of cavity lies in the dissimilar modes of healing and the difference in the type of treatment indicated. Healing in the first phase may take place either by "resolution" or by fibrous absorption. Cavities of the second degree may also heal rapidly without leaving any visible trace, but in the third degree healing is possible only by shrivelling of the walls of the cavity, by encystment, obstruction, calcification, or by complete fibrous absorption of the infected region. First-degree cavities do not as a rule demand artificial-pneumothorax treatment, while this form of therapy is nearly always required for those of the second degree. The cavity of the third degree has walls that are resistant to pneumothorax, and usually better results are obtained with thoracoplastic operation.—*A Medical and Radiological Study of Tuberculous Cavities, M. Jaquerod, Brit. J. Tuberc., July, 1929, xxiii, 123.*—(*H. McL. R.*)

Cavities in Pulmonary Tuberculosis.—The authors present a series of case reports in which, following phrenicectomy, there was an unusually rapid decrease in size or a disappearance of unmistakably diagnosed cavities more than 3 cm. in diameter, of long standing in pulmonary tuberculosis, and otherwise resisting every attempted form of therapy. Among other general indications for phrenicectomy is listed bilateral tuberculosis in which pneumothorax or thoracoplasty entails too much risk, and in which extensive disease on one side can be active and on the other side stationary or slightly active, particularly when the lesion on the less involved side is being fed by an upper-lobe cavity of the other lung. A crushing of the phrenic nerve is advocated in this type of case. The removal of the piston-like motion of the diaphragm is an important result of the phrenicectomy. The localization of the

lesion, apical or basal, is of far less importance than the ability of the lung to retract spontaneously, this being borne out by the unusual disappearance of upper lobe cavities. The cases reported show this regardless of the stage and degree of activity of the process, and there is also an impressive clearing of the disease in the opposite lung, in one case including almost complete disappearance of a large cavity. Generalized adhesions and an immobile and already raised diaphragm should not contraindicate operation, as in many such cases further marked elevation of the diaphragm occurred, due to good retractile capacity of the lung. Phrenicectomy in a large percentage of the results, however, in a series of more than 40 cases, caused little or no improvement.—*Cavities in Pulmonary Tuberculosis: Rapid Contraction of Upper and Lower Lobe Cavities with Phrenicectomy, E. Mayer and H. Leetch, J. Am. M. Ass., July 27, 1929, xciii, 272.*—(*G. L. L.*)

Form and Size of Early Cavity.—The early cavity tends to a regular round or oval form, even though it is not to be considered that the liquefaction of a lesion occurs regularly in all portions of the walls. The elasticity of the lung and the negative pressure in the pleura tend to fill out this space. The theory expounded is elucidated by the author with the aid of elastic rubber rings and mathematical formula.—*Über Form und Grösse der Frühkaverne, D. Reinders, Zeitschr. f. Tuberk., 1928, li, 438.*—(*H. J. C.*)

Observations on Pulmonary Shrinking.—The author verifies the experimental studies of Schlaepfer on the same subject and extends his observations on the mechanism of pulmonary contractions. The most marked pulmonary contraction occurs experimentally after a coincident tying of the branches of the pulmonary artery and the veins going to the heart. This procedure, however, produces severe lethal tissue changes in the involved lung areas with widespread anaemic infarcts, on account of the lack of collateral circulation due to the interruption of the branches of the bronchial arterial system. A like amount of fibrosis without danger to life is achieved by embolic closure of the pulmonary vessel and tying of the heart veins. The tying of the veins to the heart results in connective-tissue proliferation, but of variable grade, dependent upon the reserve blood-flow. The anatomical clinical results of pulmonary contraction is met in the lung by means of a local emphysema and secondary bronchiectatic formations with compensatory vicarious emphysema in the healthy lung tissues. It is concluded that only in certain forms of bronchiectasis can the tying of the pulmonary-artery branches be of value. Coincident tying of the arteries and veins is advised against on account of the severe nutritive disturbance occasioned. Under certain circumstances the tying of the vein alone may be considered.—*Pathologisch-anatomischem, klinische und experimentelle Untersuchungen über Lungenschrumpfung, F. Krampf, Zeitschr. f. Tuberk., 1928, li, 35.*—(*H. J. C.*)

Connective Tissue in Pulmonary Tuberculosis.—The author gives three classes of connective-tissue formation in pulmonary tuberculosis. His classes are (1) a dense compact sclerosis, with rich vascularization resembling the atrophic sclerosis of Letulle; (2) nodular fibrosis (the insular sclerosis of the French, and the acino-nodose tuberculosis), and (3) the ring-form fibrosis (capsule-formation predominantly around exudative foci). Clinical and biological correlations with these types are not believed possible.—*Über die Verteilung und den Ursprung des Bindegewebes bei der Lungentuberkulose. (Beitrag zum Studium der tuberkulären Lungentuberkulose), A. Sega, Beitr. z. Klin. d. Tuberk., 1928, lxix, 403.*—(*H. J. C.*)

Bone-Formation in Lungs.—Primary bone-formation in pulmonary tissue, that is, not in tuberculous foci, has been described in the literature to occur in three different forms: tuberous, reticular and diffuse. It is quite possible that these three types represent only three different developmental stages of the same process in the order of chronology as mentioned above. Three cases of bone-formation are reported. The first instance was found in a woman, 53 years of age, who had a bilateral, diffuse bronchopneumonia in the lower lobes, arteriosclerosis and dilatation of the heart. Incidental findings were a psammoma of the sphenoid bone and an osteoma of the cerebral falx. Below the grossly normal pleura of the right lung, three nodules, the size of a pea, were found; they consisted of true bone tissue. In a man, 60 years old, who had died of rectal carcinoma with multiple metastases, hard, bony bars, 2 mm. thick, were seen in the left lower lobe. Otherwise, the lung was normal. Similar bony bars were observed in the case of a 53-year-old woman who had an extensive pulmonary tuberculosis with multiple excavation. The histological picture of the second case was as follows: The pulmonary parenchyma shows emphysema and a slight

amount of anthracosis. There are multiple islets of connective tissue in the interalveolar and interlobular septa. In some of these islets ossified foci are present. The bony centres are surrounded by osteoid tissue. Some of the bone tissue contains marrow, both of the fatty and the cellular variety. In the third case, the histological picture is somewhat complicated by the presence of tuberculous foci which occasionally have eroded the bone; otherwise the condition is the same as that in the second patient. The first case shows the same structure, too, but the smooth musculature is definitely increased in volume. A tuberculous aetiology of these bone formations can be ruled out by the fact that they were not associated with necrotic foci. The pathogenesis of such bones is much discussed. Since no inflammatory signs could be detected, the author believes that they are due to abnormal development of mesenchymal tissue.—*Ueber Knochenbildungen in der Lunge, Brackertz, Centrbl. f. allg. Path. u. pathol. Anat., April 20, 1929, xlv, 129.*—(*M. P.*)

Origin and Course of Adult Phthisis.—In reviewing the total material for the year 1927, consisting of 800 roentgenographs, there were found 123 which, aside from the healed primary complex, revealed no other disease. Of the remaining 677 with actual pulmonary disease 270 showed widespread cavernous forms, and, of these, 156, or more than half, had practically healthy pulmonary apices roentgenologically. The remaining 114 showed equal disease above and below the clavicle, so that the origin of the disease could not be determined. Pure pulmonary apical tuberculosis was found 51 times, and of these there were 6 cases of isolated apical cirrhosis with cavity. Typical fresh infiltrations and fresh exudative processes were found 49 times, 11 of them in the vicinity of the pulmonary apices. Twenty-two of the 49 showed fibrous or calcareous foci, in addition to fresh infiltration, and in 10 cases the fresh infiltration was deposited around older lesions. This is viewed as proof that it did not originate as an exogenous superinfection. Of the total material 119 X-ray pictures revealed a nodose-productive reaction.—*Bemerkungen zur Frage der Entstehung und des Ablaufes der Lungenphthise des Erwachsenen, H. Spencker, Beitr. z. Klin. d. Tuberk., 1928, lxix, 625.*—(*H. J. C.*)

Origin of Tertiary Pulmonary Tuberculosis.—The author's experience as a result of the study to determine whether phthisis originates from an acute or a chronic condition and the fate of the cases of apical tuberculosis led to the conclusion that apical tuberculous conditions rarely progress and that open phthisis generally has an acute origin.—*Über die Entstehung tertiärer Lungentuberkulose, F. Hochstetter, Zeitschr. f. Tuberk., 1928, li, 101.*—(*H. J. C.*)

Epituberculous Infiltration in Adult.—The development of the clinical and anatomical picture of the so called epituberculous infiltration is considered, and 6 cases personally observed are reported, one a fatal case of diabetic coma. The differential diagnostic difficulties between exudative tuberculosis and epituberculous infiltrates is given consideration, and it is pointed out that very frequently only the course or the result of pneumothorax treatment will differentiate them.—*Zur Frage der sogenannten epituberkulösen Infiltrationen bei Erwachsenen, T. Sonnenfeld, Beitr. z. Klin. d. Tuberk., 1928, lxix, 209.*—(*H. J. C.*)

Band-Form Disposition of Pleural Exudate.—Among 4,000 cases of pulmonary tuberculosis the authors report 3 patients in whom they observed the band-form vertical disposition of the pleural exudate extending from the clavicle to the diaphragm, and resulting, at the conclusion of a closed spontaneous or artificial pneumothorax, in a serofibrinous or seropurulent pleurisy. It is believed that the retrogression and disappearance of the pleuritis and subsequent expansion of the lung leads to the existence of the conditions necessary for this type of pleuritis.—*Die Bandförmige Vertikallagerung des Pleuritis-exsudates als Resultat einer umfangreichen Pneumopleuritis, B. A. Wolter and A. N. Krewer, Beitr. z. Klin. d. Tuberk., 1928, lxix, 482.*—(*H. J. C.*)

Retrograde Lymphatic Infection.—The author reports 8 cases of regressive specific lobar pneumonia in tuberculous children, which were studied clinically and roentgenologically, and 2 of them examined at autopsy. There was a definite relation between the condition and that of the hilum lymph node, which led the author to believe in a retrograde lymphatic affection of the lung tissue.—*Regressive spezifische lobäre Pneumonien bei tuberkulösen Kindern im frühren Kindesalter, J. S. Leitmann, Beitr. z. Klin. d. Tuberk., 1928, lxix, 606.*—(*H. J. C.*)

Juxtafissural Lesions in Pulmonary Tuberculosis.—Sergent and Durand have long since called attention to the importance of "fissuritis" and "perifissuritis" in the

course of pleuropulmonary tuberculosis and of fissural limitation of tuberculous pulmonary processes. Lobar tuberculosis is by no means confined to the right upper lobe, nor does it invariably assume the fibrosclerotic type described by Bernard and Bethou. It may develop under any pathological form,—caseous, exudative, cavitating, fibrous, and in any lobe. Left lobar tuberculosis, however, is more apt to go unrecognized because of the angle of contact of the two lobes. Especially may roentgenographs in the anteroposterior plane be misleading. Here teleoroentgenography is of great value. Finally, if one has recourse to artificial pneumothorax, after a few insufflations the lobes separate and are seen individually if there is no symphysis. In speaking of juxtafissural foci, the juxtafissural location of the lesion is not necessarily implied, but also often an intrafissural lesion or interlobar pleurisy. The term "focus of the fissural region" is more comprehensive, and in fact the diagnosis of interlobar pleurisy is too much abused. No doubt interlobar pleurisy does occur in the tuberculous but it is much rarer than juxtafissural pulmonary foci. The two processes may also be associated and often the pleura in the vicinity of a large cavity undergoes a dense corticopleuritis. In referring to the lobes of the left lung it seems preferable to call them anterosuperior and posteroinferior. If a juxtafissural focus belongs to the upper, or anterosuperior, lobe, it will give stethoscopic signs in front of the fissure; if to the lower, or posteroinferior, behind the fissure. This principle can be best illustrated in the lateral or axillary region. In the case of the pulmonary dome, a juxtafissural focus situated in the upper part of the anterosuperior lobe, will give stethoscopic signs corresponding to the apical projection of the pulmonary dome, that is, demonstrable in the supraspinous fossa and the anterosuperior part of the axilla; one located in the posteroinferior lobe will give signs demonstrable in the lateral part of the subspinous fossa and the posterior axilla. In the case of the base, a juxtafissural focus in the lower part of the anterosuperior lobe will give signs in the submammary region; one in the lower part of the posteroinferior lobe will be manifest in the lower anterolateral part of the chest, above the diaphragm. *What are the characteristic physical signs?* A zone of dulness on percussion is most characteristic, indicating either pulmonary density, fluid, or pleural thickening. Occasionally, in the presence of deep-seated foci, this sign is lacking. Inspection may reveal diminished excursion of the hemithorax. On palpation over the fissure it is common to elicit pain, if it is not already present, due to the localized inflammatory reaction. Exaggeration of vocal fremitus in the form of a band is also common, and pleural friction may be determined by palpation. The auscultatory signs are significant principally when their distribution follows that of the band or zone of dulness. Juxtafissural foci of the anteroinferior part of the anterosuperior lobe give a characteristic zone of "suspended dulness" between two sonorous zones. A careful percussion should always be able to determine on which side of the fissure lies the lesion, as it will be more sharply limited on the fissure side and shade off more on the other side. *Roentgenographic Findings:* Fifteen observations are cited, of which eight are reproduced. Of the 15 cases, all on the left side, only 2 involved the lower lobe. Also, suprafissural localizations predominate. Frontally, in such cases, one sees in the lower part of the pulmonary field an opaque band, more or less dappled or striated, its lower border somewhat curved, and convex below, its upper border less well defined, shading off, or merging progressively with the normal pulmonary transparency. This opaque band becomes confused internally with the left border of the cardiac shadow, which it seems to cross. Below and outside one sees a small clear triangle, corresponding to the lower lateral part of the posteroinferior lobe, with its terminal truncal ramifications, limited below by the diaphragm and above by the opaque band. Teleoroentgenography helps to establish the position of the opacity anteriorly. Another method of differentiation is after performance of artificial pneumothorax. Either after the first insufflation or later the lobes separate; the lower preserves its expansion and transparency; the upper, more or less collapsed, shows in its lower portion an opaque block representing the suprafissural focus. The most frequent of all localizations is in the inferolateral part of the anterosuperior lobe. *Subfissural foci* show an opaque band cutting obliquely from top to bottom and from without inwards. The stethoscopic signs indicate a posterolateral localization and a few insufflations into the pleura demonstrate the lesion in the lower lobe, which collapses incompletely, its superolateral portion ,remaining opaque, like a piece of cake. In such cases artificial pneumothorax is not only of diagnostic but therapeutic value. Such is the picture of partial lobar tuberculosis of the left lung.—*Le syndrome clinique et radiologique des foyers juxtascissuraux gauches dans la tuberculose pulmoniare, E. Sergent and Toglescu, Rev. d. l. Tuberc., August, 1928, ix, 489.*—(*A. P.*)

Dissemination of Haemoptyses in Lungs.—Cardis had previously noted that bilateralizations occurred almost exclusively in patients with positive sputum, the only exceptions being those without sputum but having had haemoptyses. These latter cases seemed to present a typical roentgenographic picture, a regular micronodular dissemination of considerable density involving a rather large pulmonary field. This was thought to be attributable to direct endobronchial aspiration of the blood, but until recently proof was lacking in the absence of a picture prior to the haemoptysis. A case was, however, found: A young girl of 24, after slight prodromal symptoms extending over three months, had an "initial" haemoptysis. A month later a right subclavicular cavity showed in the film. Ten days later the patient spat blood abundantly and her temperature, which had been subfebrile, rose on the second day to 38.8°C. and returned to normal in a week. At this time another roentgenograph showed the persistence of the cavity and the appearance of a regular micronodular dissemination in the lung field, especially around and below the cavity. Although suggestive of haematogenous dissemination in the regularity and distribution of the foci, the picture also suggested the appearance familiar to phthisiologists after intratracheal injection of lipiodol. If there had occurred an ordinary progression of the disease the foci would scarcely have been uniform unless there had been a bronchial embolus of tuberculous masses, unlikely in the absence of expectoration; moreover, its evolution would have been different. The thermic curve is of considerable value. Initial pulmonary activity was signalized by a subfebrile disturbance and this activity probably provoked the haemoptysis by causing erosion of a vessel. Aspiration of blood inundated a number of alveoli and the organism defended itself by local exudation and fever. The favorable outcome in a short space of time clinches the argument. Confluence and softening of the micronodules have never been observed, progressive and rapid disappearance of the foci being the rule. This is easily understandable on the hypothesis of aspirated blood. When such a dissemination occurs in the absence of haemoptysis there is a strong tendency toward caseation, with hectic undulating temperature, ending in death. Such a case, carrying a pneumothorax and a tuberculous empyema, is described. The analogy to finely dispersed lipiodol is close and reminds us that the quantity of the haemoptysis need not be great. Only 20 cc. of lipiodol are necessary to produce extensively disseminated lesions. Another case in a young girl of 23, is cited, in which infracavity micronodules appeared on the second roentgenograph, doubtless due to direct aspiration of blood. Three points support this: *1:* The haemoptysis was followed by fever, rendering probable the installation of the new foci determined. *2:* The evolution of these foci was rapidly favorable, despite the aggravation of the purely tuberculous lesions causing the haemoptysis. This leads to the dictum that the prognosis of haemoptoic dissemination is good, and that of the mother lesion, let us say, mediocre. *3:* The roentgenographic aspect of the new foci was what, following experience with lipiodol, we would term aerial aspiration. Up to the present two essentially different explanations have been given for the mottled appearance of the lung: foreign-body reaction (traumitis) of Bezançon and Braun, and *granulie froide* (cold miliary tubercle) of Burnand and Sayé. Such cases are not rare. On going over a series of roentgenographs such a micronodular appearance was frequently noted by Bernard and Cardis, and they were able often to relate it to a more or less abundant preceding haemoptysis, followed by a febrile evolution. In at least 30 out of 200 cases from the Popular Sanatorium such an appearance and relation seemed quite definite. Three of these are cited. With such a mottled or stippled aspect one should think, in the absence of important tertiary lesions, of a haemoptoic dissemination. From the clinical viewpoint, such haemoptyses generally occur in young persons in good general health. Although blood-spitting is often abundant, one cannot judge from this the amount aspirated. The temperature is normal or subfebrile prior to the haemoptysis, rising shortly after its onset. High fever has never been observed to precede the bleeding. Endobronchial aspiration probably precedes the appearance of blood in the sputum and the fever is associated with defensive reactions. The evolution is generally favorable. The blood ordinarily contains few tubercle bacilli and is reacted to like any foreign body by a mobilization of leucocytes. The ultimate outcome is determined by the number and virulence of the tubercle bacilli. Resorption probably occurs *via* the lymphatics. It is finally remarked that such haemoptoic seepage does not certainly imply tuberculosis and that bronchiectasis may give rise to mistaken diagnoses. Physical examination is variable. Auscultatory sounds may be absent, or bronchial or pleurocortical. Practically, the diagnosis of haemoptoic dissemination is made when fever follows immediately afterward and coexists with such micro-

nodular lesions as described in the roentgen films.—*Aspect radiologique micronodulaire de l'essaimage hémoptoique dans la phtisie, F. Cardis, Section d'études scientifiques de l'Oeuvre de la Tuberculose, June 9, 1928, reported in Rev. d. l. Tuberc., August, 1928, ix, 604,*—(*A. P.*)

Action of Graphite Dust on Lung.—The author examined the workers in a pencil factory for pneumonokoniosis. The workers inhale either a mixture of carbon dust or graphite dust. A five-year contact with this work revealed in no cases a pneumonokoniosis, although the "snowstorm phenomenon" was observed in 9.1 per cent of those cases over 5 years in the industry and 1.6 per cent of all workers. Clinically bronchitis and emphysema were observed 19 times. Among the tuberculous changes noted there were 2 with calcified primary complexes, 2 with cirrhotic and slightly inactive apical disease. Graphite dust, therefore, does not act differently from pure coal dust. The presence of pneumonokoniosis with either one of these or both is a rare finding.—*Über die Einwirkung von Kohlen- und Graphitstaub ohne Gesteinsbeimengung auf die Lunge, R. Hollmann, Zeitschr. f. Tuberk., 1928, lii, 394.*—(*H. J. C.*)

Lung Volume.—The respiratory exchange in the lower branches of the bronchial tree, the bronchioles and the alveoli is carried on both by diffusion and by respiratory movements. The efficiency of the latter is most important in abnormal pulmonary conditions. The vital capacity or the volume of air expired by a maximum expiration after a maximum inspiration, and the reserve air, or the volume of air expelled from the lungs between an average resting expiration and a maximum expiration, can be readily determined by a spirometer. The total lung volume, or the total capacity of the lungs at the end of a maximum inspiration, the residual air or the volume of air remaining in the lungs after a maximum expiration, and the functional residual air, or the amount of air which is in the lungs at the end of an average resting expiration, can be determined only by a complicated method such as that described by Van Slyke and Binger. The principle of this method and the means of making calculations for the various phases of respiration are described. The efficiency of pulmonary ventilation, and consequently the determination of dyspnoea, seems to rest upon the relationship between the residual air and the total lung capacity. This averages about 33 per cent in healthy adults. Tracings of respiratory movements for the normal and for cases of pleurisy with effusion and circulatory failure are given. Thoracic lesions which might interfere with pulmonary ventilation may be divided as follows: *1:* Those conditions which, though encroaching upon the total alveolar area of the lung, do not interfere with the expansile power of the uninvolved portions. Examples are hydrothorax, pneumothorax and localized tuberculosis. *2:* Those conditions of the lungs or thorax which interfere either with the expansibility of the lung or the efficiency of the respiratory muscles. Examples are found in chronic passive congestion of the lungs due to circulatory failure, chronic emphysema, paroxysmal asthma, and paralysis of the intercostals or diaphragm, or severe pleuritic pain. Other conditions, such as acute lobar pneumonia, miliary tuberculosis, diffuse bronchiolitis and massive lung collapse, cannot be included in either category. In pleurisy with effusion, though the vital capacity may be markedly reduced, the ratio between the total lung capacity and the residual air remains within normal limits, and there is no dyspnoea on ordinary exertion. In circulatory failure there is found a more or less direct relationship between the severity of the pulmonary symptoms and the reduction of vital capacity. Also, the residual air is relatively and absolutely increased, and decreased, in direct proportion to the respiratory symptoms, and may amount to more than 50 per cent of the total lung capacity. Not unusually the reserve air completely disappears. The same conditions hold true for pulmonary emphysema. In considering the cause of dyspnoea in any individual case a number of intimately connected factors may contribute toward the result and none should be overemphasized. Sufficient attention has not been given to variations in the relative conditions existing in lung ventilation.—*Lung Volume and Its Variations, J. C. Meakins and R. V. Christie, Ann. Int. Med., November, 1929, iii, 423.*—(*R. M. F.*)

Distribution of Vitamine D.—Vitamine D is much the most limited in distribution of all the known vitamines. Codliver oil, other fat oils, notably from puffer-fish liver, goosefish liver, shark liver and haddock liver, the body oils of certain samples of herring and sardines, salmon body fat, egg yolk, and butter fat to a slight extent, are practically the only naturally occurring sources so far discovered. Vegetable foods, even the green vegetables so rich in vitamine A, are ordinarily lacking in D.—*Distribution of Vitamine D: Cod Liver Oil, K. Blunt and R. Cowan, J. Am. M. Ass., October 19, 1929, xciii, 1219.*—(*G. L. L.*)

Vitamine D in Adults.—Experiments seem to indicate that short-time withdrawal of vitamine D or its addition in moderate amount has no measurable effect on the calcium and phosphorus metabolism of the adult, but that addition of large amounts of it may possibly do harm. Abnormalities of the parathyroid have been shown to bring about high blood calcium and high excretion of calcium, leading to continued negative calcium balance. Codliver oil probably exerts its effect on calcium metabolism by stimulating the parathyroid tissue to increased activity, more parathyroid hormone being produced. It is not surprising, in view of this relationship between the effect of codliver oil and parathyroid hormone, that growing animals and adults should react differently because of the great differences in the calcium equilibrium in their bodies. The young, with their constant need of calcium for bone growth, can dispose of the element as fast as they get it, so that stimulating the parathyroid and so increasing the calcium of the blood means increased retention. Adults, on the other hand, have only a smaller, steadier need for calcium, so a temporary increase in the blood means decreased retention and actual loss.—*Do Adults Need Vitamine D?, K. Blunt and R. Cowan, J. Am. M. Ass., October 12, 1929, xciii, 1141.*—(*G. L. L.*)

Influence of Diaphragm on Oesophagus.—Two types of contraction can be observed by digital examination of the cardia, namely, a circular, constricting contraction, and a downward, milking contraction. Fluoroscopic examination of the course of barium in the stomach reveals an obstruction in the region of the cardia coincident with each inspiration and a relaxation with release of the obstruction with each expiration. The obstruction noticed fluoroscopically may correspond to a single phase of the downward contraction and is, no doubt, identical with the pinch-cock contraction described by Jackson. Belching is accomplished by the coördinate contraction of the abdomen, the stomach and the costal end of the diaphragm, with the relaxation of the vertebral end. Spasm of the diaphragmatic pillars with obstruction and dilatation of the oesophagus may be relieved by deep inspirations and expirations. So called cardiospasm may be an exaggeration of the normal contractions of the diaphragmatic pillars. A persistent spasm of these bundles will, no doubt, cause a chronic obstruction at the cardia.—*Influence of the Diaphragm on the Esophagus and on the Stomach, M. Joannides, Arch. Int. Med., December, 1929, xliv, 856.*—(*W. I. W.*)

Lymphatic Absorption of Particulate Matter.—These experiments on absorption through the normal and the paralyzed diaphragm confirm the observations made by Higgins and Graham that five main channels carry the particulate matter from the peritoneum upward through the thorax and into the blood-stream. These five routes and their functions are as follows: The first, the sternal route, which is much the most important, is that by which at least 80 per cent of the particulate material is carried. The second, the pulmonary route, is represented by a small vessel that empties its lymph into the nodes at the hilum of the lung and by a vessel that is parallel to the phrenic artery and nerve, and carries its lymph to a node in the anterior mediastinum. The third route is through the thoracic duct, which receives as tributaries small vessels that pass over the dorsal portion of the diaphragm and enter it in various positions along its course. The two remaining routes, the fourth and fifth, are represented first by vessels that pass over the dorsal surface of the diaphragm, pierce it, and empty their lymph into the lymph nodes in the region of the kidney, and, second, by small vessels which also pass over the vault of the diaphragm to a point anterior to the aortic opening where they pierce the diaphragm and pass downward into the splenic mesentery and pour their contents into the lymphatic node in the region of the pancreas. All of the nodes which receive the tributaries are in turn connected by vessels with the *receptaculum chyli*. The experiments also have demonstrated the presence of a descending thoracic vessel which passes downward over the posterior wall of the thorax, sometimes receiving tributaries from the vessels of the posterior portion of the diaphragm and communicating with the lymph nodes in the region of the kidney. The particulate matter seems to be taken up diffusely on the under surface of the diaphragm. It passes between the mesothelial cells of the peritoneum into tiny lymphatic vessels and thence is carried between the muscle bundles until it is deposited within the subpleural plexus of lymphatic vessels. This transfer from the peritoneal surface to the pleural surface is rapid; it requires only from three to five minutes in normal muscle and from ten to twelve minutes in paralyzed muscle. The penetration of the particulate matter into the blood-stream is effected within a period of from thirty minutes to one and a half hours. The lymph taken from the lymphatic vessels on the surface of the diaphragm is mainly found in a free state, although a few phagocytic cells also contain some of it. The material taken from lymph

nodes is found mainly to be enclosed in phagocytic cells, although a slight amount is still free. That which comes later through the thoracic duct is mostly enclosed within the phagocytic cells, but some particles are still in a free state. When obtained from the blood, it is both in free state and enclosed in phagocytic cells. It is probable that the monocytes take up the free material very quickly after it has been passed into the blood stream. There is no question that normal muscular contraction of the diaphragm contributes much to the passage of the particulate matter through the diaphragm. Nevertheless, the difference in size of the lymphatics on the two leaves of the diaphragm also is important. The lymphatics on the right side are much larger and carry a much larger proportion of the lymphatic flow than those on the left. Even after paralysis of the right half of the diaphragm, the pattern discovered after the lapse of thirty minutes is more distinct on the paralyzed right side than on the normal left side. Absorption through the left half of the diaphragm, when that half is paralyzed, is insignificant. Often the vessels are but indistinctly outlined. It is apparent from the evidence obtained in the prolonged absorption experiments that the primary flow of particulate matter stops as soon as the lymph nodes become choked with graphite. It is assumed that the lymphatics of the diaphragm are concerned with absorption from the peritoneal space.—*Lymphatic Absorption of Particulate Matter Through the Normal and the Paralyzed Diaphragm: An Experimental Study, W. S. Lemon, Am. J. M. Sc., October, 1929, clxxviii, 536.*—(*W. I. W.*)

Artificial Respiration.—A new method for artificial respiration which makes use of an intratracheal catheter is described. It differs from the Meltzer method in that the lungs are expanded every four seconds by air under pressure, then allowed to collapse and remain collapsed for three seconds. The alveolar air is changed, as in natural respiration, by movement of the lungs. During the stage of collapse, the flow of air through the catheter continues, under very low pressure, but not sufficient to expand the lungs. This method of artificial respiration has been used successfully in animals. Clinically, it has been used in two cases.—*An Intratracheal Method for Prolonged Artificial Respiration, L. Brahdy and M. B. Brahdy, Am. J. M. Sc., September, 1929, clxxviii, 405.*—(*W. I. W.*)

Urochromogen.—As urochrome the authors consider the oxydation products of urochromogen. The material considered as urochrome is prepared by adding a small amount of sodium perborate, Merck, dissolved in concentrated, ammonia-free suphuric acid. After cooling, this is added to 2 cc. of cool urine (50°C. cannot be exceeded). Shaking out with 3 cc. of ether results in a yellow color being taken over by the ether, which is the dissolved urochrome. The pure urochrome separates as needles, which are soluble in ether, alcohol and petroleum ether, as well as in mineral and organic acids, and are only slightly soluble in water. If the ether solution of urochrome is treated with 10 parts of ammonia it changes to a brown color, which the authors leave open as to whether it is the ammonium salt of urochrome or a uromelanin, although the latter idea is preferred. A method is described in which the urochrome can be determined quantitatively in the Autenrieth colorimeter. Urochrome, like uromelanin, has an aromatic nucleus with a sulphur component in the molecule.—*Über das Urochromogen. II. Herstellung und quantitative Bestimmung, E. Schuntermann and F. K. Hoffmann, Beitr. z. Klin. d. Tuberk., 1928, lxix, 438.*—(*H. J. C.*)

Rôle of Calcium in Tuberculosis.—Calcium is normally present in the blood and tissue fluids in the amount of approximately 0.01 per cent (10 mgm. per 100 cc.). Our knowledge of calcium metabolism is incomplete for it is largely founded on blood or urinary estimations. Yet such large quantities of calcium may be voided by the intestinal route as entirely to vitiate conceptions based on a more limited method of investigation. The diet of an ordinary individual should contain about 0.5 gm. per diem. For treatment (tuberculosis) the daily intake should not be less than 1.0 gm. The commonest cause of lime insufficiency is inadequate absorption rather than inadequate intake. It is probable that adequate absorption never takes place in the absence of a sufficiency of vitamin D, contained in codliver oil, or produced by the action of ultraviolet rays, either from the sun or from an artificial source upon minute quantities of ergosterol present in the skin. Hence, in the administration of calcium, one or other of these activators of calcium metabolism should simultaneously be employed. Yet the vital issue really is how much calcium is retained in the tissues to be available for bone-building, blood coagulation, resistance to infection, and other somatic requirements. This is dependent upon internal secretions and the acid-base balance of the body. Excessive calcium is eliminated if this balance is deviated much either to the acid or the alkaline side; hence the impor-

tance of a properly balanced dietary. Augmented activity of the thyroid and suprarenal medulla causes increase in excretion of calcium, whereas extra activity of the thymus, the anterior portion of the pituitary, the islets of Langerhans in the pancreas and the suprarenal cortex all directly or indirectly favor calcium retention. The parathyroids apparently have a particular and specific action on calcium metabolism, their main function being that of regulators. Calcium has long been used in France in the treatment of tuberculosis but much less so in England. If we classify tuberculosis as either of the "hard lung" (fibrocalcareous) or "soft lung" (exudative) type, biochemically the first group connotes a normal or deficient calcium urinary and faecal excretion, and the latter a calcium excess excretion. The fibrocalcareous cases do not need control or treatment by calcium unless their resistance becomes impaired, and then benefit by the exhibition of calcium alone. The exudative cases badly need calcium in combination with parathyroid and vitamin D. Useful forms of calcium for administration are tricaline, calcium gluconate, Kalzana and colloidal calcium, which give better results than the lactate. A convenient method of giving calcium chloride is in 10 grain doses in a mixture combined with 10 minim doses of phosphoric acid. Parathoromone is the only active parathyroid preparation available for parenteral administration. The potency of most oral preparations is doubtful.—*The Rôle of Calcium in the Prevention and Treatment of Tuberculosis, J. F. H. Dally, Brit. J. Tuber., April, 1929, xxiii, 70.*—(*J. S. W.*)

Basal Metabolism and Specific Dynamic Protein Action in Tuberculosis.—In 61 cases of predominantly fibrous type the authors could find no relation between the basal metabolism and the activitity of the pulmonary process, and pulmonary collapse was without effect. It is, however, believed that the tuberculous infection is the main cause of an increased metabolism even though this is of no value in diagnosis or therapeusis. In testing the specific dynamic egg-white action the authors found subnormal, normal and increased values, the latter most frequent up to 70 per cent. A relation between the basal metabolism and specific dynamic protein effect was not determinable. Activity and the height of a specific protein effect did not parallel each other. It is believed by the authors that in certain cases a limitation of the protein diet is important in pulmonary conditions.—*Gasstoffwechseluntersuchungen bei Tuberkulösen mit besonderer Berücksichtigung der spezifisch-dynamischen Eiweisswirkung, F. Salus and H. Adler, Beitr. z. Klin. d. Tuberk., 1928, lxx, 733.*—(*H. J. C.*)

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